

**DESIGN SPECIFICATION FOR (MPT)<sup>2</sup> PRODUCT 1**  
**SYSTEM PERFORMANCE REQUIREMENTS**  
**ESTIMATION AID**

**Contract MDA903-86-C-0412**

**1 January 1988**

**Volume II**

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# **Working Paper**

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VOLUME I I

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## SECTION 4 - DESCRIPTION OF LIBRARIES

### 4.1 Overview

The automated components of Product 1 reside in the SPREA Applications Manager and consist of data libraries, data files, SPREA Templates, Micro SAINT Models, and a SPREA Report Generator. The remaining sections of this document present detailed descriptions of each of these components.

The analyst will be able to access the data libraries to pull up missions, functions, tasks, and RAM requirements that are comparable to the ones for which the system is intended. Each of the entries in the libraries will have default information that the analyst will use for "baseline" data. If the analyst modifies a data field that is likely to affect another field, he or she will be prompted to that effect.

The analyst will be able to add, modify, copy, delete, save, and view the elements of the libraries. However, when the analyst is modifying an element of a library, a working copy of the element will actually be changed. This will prevent any loss of data, and ensure that "old" missions will continue to be executable.

If the libraries do not contain entries similar to the ones that the analyst needs, the user interface will allow the analyst to either a) modify an existing entry to create the one that is needed, or b) begin from scratch to enter the needed information. The software will aid the analyst in entering the needed information and will store the new task in the library so that it will be available the next time it is required. In this manner, the data libraries will be expanded as new missions, functions, tasks, and task sequences are needed. It will be important to safeguard the library data and follow configuration management



procedures.

There are 13 data libraries, each of which are discussed in detail in the next subsection of this document. Each of these libraries will contain a selected set of data when the SPREA is delivered. This data is included in the discussion in the next subsection.

The list of data libraries is included in Table 4.1-1, below. The status of the libraries (i.e., percent completion and data sources which will be accessed to complete the libraries) is presented in Table 4.1-2.

Table 4.1-1

## List of Library Files

Library	Section	Page
Missions by System Type	4.2.1	4-5
Functions and Tasks by System Type	4.2.2	4-11
Functions by Mission	4.2.3	4-48
Conditions by System Type	4.2.4	4-54
Conditions by Function	4.2.5	4-248
Function Sequence by Mission	4.2.6	4-266
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Generic Equipment by System Type	4.2.8	4-269
Maintenance Hour Allocations by Generic Equipment Type	4.2.9	4-282
Maintenance Hour Allocations by Maintenance Task	4.2.10	4-295
Baseline Time and Accuracy Values by Function and Task	4.2.11	4-337
Baseline RAM Values by System Type	4.2.12	4-339
Accuracy Standards Metrics by Function and Task	4.2.13	4-340

Table 4.1-2  
Current Status of Each Library

Library	% Complete	Data Sources Yet to be Accessed
Missions by System Type	100	N/A
Functions and Tasks by System Type	100	N/A
Functions by Mission	100	N/A
Conditions by System Type	100	N/A
Conditions by Function	100	N/A
Function Sequence by Mission	4	"How to Fight" Manuals, SMEs, MAA, MADP
Task Sequence by Function	0	"How to Fight" Manuals, SMEs, MAA, MADP
Generic Equipment by System Type	100	N/A
Maintenance Hour Allocations by Generic Equipment Type	11	FMDC, Req'ts. Docs.
Maintenance Hour Allocations by Maintenance Task	6	FMDC, Req'ts. Docs.
Baseline Time and Accuracy Values by Function and Task	11	NTC(?), T&E, Req'ts. Docs., combat models, SMEs
Baseline RAM Values by System Type	6	Req'ts. Docs., FMDC, T&E data
Accuracy Standards Metrics by Function and Task	11	T&E data, SMEs, Req'ts. Docs.

FMDC = Field Maintenance Data Collection  
T&E = Test and Evaluation  
SMEs = Subject Matter Experts  
NTC = National Training Center

## 4.2 - Description of Library File Structures and Data

### 4.2.1 - Missions by System Type

The Mission by System Type Library will contain a list of all the missions that have been entered into the SPREA. These missions will be sorted alphabetically by system type. The system types will be grouped by mission area. This structure will enable the user to locate a specific mission easily.

The information that is attached to the mission (e.g., composite tasks and sequencing data, threat characteristic data, etc.) will be referenced by mission name and code. Thus, each mission could have a variety of different condition sets or threat possibilities.

## INFANTRY AND ARMOR SYSTEM MISSIONS

### SYSTEM MISSIONS

Destroy enemy troops  
Destroy fixed emplacements  
Destroy enemy armored vehicles  
Delay and suppress enemy activity  
Escort/screen friendly forces  
Seize and Occupy Terrain  
Perform Reconnaissance  
Transport Combat Troops

Above missions would apply to following system types:

- infantry fighting vehicles
- antitank vehicles
- man-portable direct fire weapons
- tanks
- calvary fighting vehicles

Notes: Not all missions would be applicable to all system types.  
Missions for man-portable indirect fire infantry weapons (i.e, mortars) are reported under the fire support missions.

## FIRE SUPPORT SYSTEM MISSIONS

### SYSTEM MISSIONS

Destroy enemy maneuver forces (close support fires)  
Destroy enemy fire support forces (counterfire)  
Delay and suppress enemy activity (interdiction)  
Provide illumination  
Conceal friendly forces by making smoke

Above missions would apply to following system types:

- Medium range missile artillery systems
- Towed howitzers
- Self-propelled howitzers
- Rocket systems
- Man-portable indirect fire systems (mortars)

Notes: Not all missions would be applicable to all system types

## AIR DEFENSE MISSIONS

### SYSTEM MISSIONS

Destroy enemy aircraft

Destroy enemy (ground) troops

Destroy enemy armored vehicles

Above missions would apply to following system types:

-mobile gun systems

-man-portable air defense systems

Notes: Not all missions would be applicable to all system types.

## AVIATION SYSTEM MISSIONS

### SYSTEM MISSIONS

Destroy enemy troops  
Destroy enemy fixed emplacements  
Destroy enemy armored vehicles  
Destroy enemy helicopters  
Delay/suppress enemy activity  
Escort/screen friendly forces  
Perform reconnaissance  
Transport combat troops  
Transport logistical supplies  
Evacuate Casualties

Above missions would be apply to following system types:

- attack helicopter
- cargo helicopter
- utility helicopter
- scout helicopter

Notes: Not all missions would be applicable to all system types.



## SYSTEM MISSIONS FOR TRANSPORT TRUCKS

### SYSTEM MISSIONS

- Transport personnel
- Transport cargo

Above missions are for following system types:

- Light cargo trucks
- Heavy cargo trucks

Note: Only transport missions and functions will be included. Trucks could be mounted with various attachments (e.g., winches) which would add missions but these missions and/or functions are not included.

#### 4.2.2 - Functions and Tasks by System Type Library

The Function Library will be similar to the Mission Library. It will include a listing of all functions and their composite tasks which have been entered into the SPREA. The Function Library will be sorted in alphabetic order within the system type. The system types will be grouped by mission area.

OPERATIONAL FUNCTIONS FOR INFANTRY FIGHTING VEHICLES,  
CAVALRY FIGHTING VEHICLES, ANTI-TANK VEHICLES & TANKS

1. PLAN AND PREPARE MISSION

- Receive/Review Order
- Adjust/Boresight Weapon System
- Adjust/Inspect Other Systems
- Enter Data onto Onboard Computers
- Prepare for NBC Environment

2. EXECUTE MOVEMENT

- Start Engine
- Check Controls/Instruments
- Perform non-Tactical Movement
- Perform Tactical Movement
- Perform Water Crossing

3. EXECUTE MANEUVER

- Perform Evasive Maneuvers
- Move to Cover
- Negotiate Obstacles
- Employ Smoke Screen
- Move Into Firing Position
- Move Out of Firing Position

4. NAVIGATE

- Identify Present Location
- Identify Destination
- Select Travel Route
- Estimate Time of Arrival and Fuel Requirements
- Identify Terrain Features
- Use Instruments (i.e. Compass) to Select Correct Heading

5. COMMUNICATE

- Transmit/Receive Messages

- Encode/Decode Messages
- Use Counter Measure Procedures
- Relay Messages
- Obtain Line of Signal

6. ACQUIRE TARGETS

- Search for Targets
- Detect/Locate Targets
- Identify Friend or Foe
- Identify/Locate Sources of Enemy Fire

7. ENGAGE TARGETS

- Select Target(s)
- Select Weapon and Ammo
- Aim/Sight Weapon
- Track Target
- Fire Weapon
- Adjust Fire
- Assess Damage

8. OCCUPY DEFENSIVE POSITION

- Select Position
- Camouflage Position
- Improve Cover
- Select Reference Points
- Develop Range Cards
- Coordinate with Adjacent Vehicles/Personnel

9. CALL FOR/ADJUST SUPPORTING FIRE

- Call For/Adjust Artillery/Mortar Fire
- Call For/Adjust Aerial Fire
- Adjust Tank/Other Fighting Vehicle Fire

10. TRANSPORT COMBAT TROOPS

- Load Troops/Equipment
- Secure Troops/Equipment

- Unload Troops/Equipment

11. COMPENSATE FOR EQUIPMENT MALFUNCTIONS & EMERGENCIES

- Identify Malfunction
- Identify Source of Malfunction
- Compensate for Malfunction/Execute Emergency Procedures
- Evacuate Vehicle (if appropriate)

12. PERFORM POST OPERATIONS TASKS

- Shut Down Engine
- Power Down Other Systems
- Perform Checks

## OPERATIONAL FUNCTIONS FOR RIFLES

1. CONDUCT PRE-OPERATIONAL INSPECTION
2. PREPARE WEAPON FOR FIRING
  - Assemble Weapon
  - Mount Sight
  - Zero Sight
3. GET INTO FIRING POSITION
  - Load Weapon
  - Select Type of Fire
  - Select Firing Position
  - Get Into Firing Position
4. DETECT/LOCATE TARGETS
  - Search for Target
  - Detect/Locate Target
  - Identify Friend or Foe
5. FIRE WEAPON
  - Determine Target Range
  - Select Target
  - Aim/Sight Weapon
  - Fire Weapon
  - Adjust/Fire
  - Unload
6. PERFORM POST FIRING TASKS
  - Get out of firing position
  - Perform Post-Operation Checks
  - Dismount Sight
7. CLEAR/RECOVER FROM MISFIRE

## OPERATIONAL FUNCTIONS FOR GRENADE LAUNCHERS

### 1. CONDUCT PRE-OPERATIONAL INSPECTION

### 2. PREPARE WEAPON FOR FIRING

Assemble Weapon

Mount Sight

Zero Weapon

Zero Sight

### 3. GET INTO FIRING POSITION

Load Weapon

Select Type of Fire

Select Firing Position

Get Into Firing Position

### 4. DETECT/LOCATE TARGETS

Search for Target

Detect/Locate Target

Identify Friend or Foe

### 5. FIRE WEAPON

Determine Target Range

Select Target

Aim/Sight Weapon

Fire Weapon

Adjust/Fire

Unload

### 6. PERFORM POST FIRING TASKS

Get out of firing position

Perform Post-Operation Checks

Disassemble Weapon

Dismount Sight

### 7. CLEAR/RECOVER FROM MISFIRE

## OPERATIONAL FUNCTIONS FOR MAN-PORTABLE ANTI-TANK WEAPONS

### 1. CONDUCT PRE-OPERATIONAL INSPECTION

### 2. PREPARE WEAPON FOR FIRING

Assemble Round

Mount Tracker

### 3. GET INTO FIRING POSITION

Select Firing Position

Get Into Firing Position

### 4. DETECT/LOCATE TARGETS

Search for Target

Detect/Locate Target

Identify Friend or Foe

### 5. FIRE WEAPON

Determine Target Range

Select Target

Aim/Sight Weapon

Fire Weapon

Track Target

### 6. PERFORM POST FIRING TASKS

Get out of firing position

Disassemble Weapon

### 7. CLEAR/RECOVER FROM MISFIRE



## OPERATIONAL FUNCTIONS FOR AUTOMATIC WEAPONS

### 1. CONDUCT PRE-OPERATIONAL INSPECTION

### 2. PREPARE WEAPON POSITION

### 3. PREPARE WEAPON FOR FIRING

Assemble Weapon

Mount Sight

Zero Weapon

Zero Sight

### 4. GET INTO FIRING POSITION

Load Weapon

Select Type of Fire

Select Firing Position

Get Into Firing Position

### 5. DETECT/LOCATE TARGETS

Search for Target

Detect/Locate Target

Identify Friend or Foe

### 6. FIRE WEAPON

Determine Target Range

Select Target

Aim/Sight Weapon

Fire Weapon

Adjust/Fire

Unload

### 7. PERFORM POST FIRING TASKS

Get out of firing position

Remove aiming stakes

Perform Post-Operation Checks

Disassemble Weapon

Dismount Sight

8. CLEAR/RECOVER FROM MISFIRE

OPERATIONAL FUNCTIONS FOR MAN-PORTABLE INDIRECT  
FIRE INFANTRY WEAPONS (MORTARS)

1. PERFORM PRE-OPERATIONAL CHECKS
2. PREPARE POSITION
3. PREPARE MORTAR FOR FIRING
  - Assemble Mortar
  - Lay Mortar
  - Boresight Mortar
  - Perform Pre-Fire Checks
4. FIRE MORTAR AT INDIRECT FIRE TARGETS
  - Receive Firing Order
  - Prepare Ammunition for Firing
  - Set Elevation and Deflection
  - Load Mortar
  - Fire Mortar
5. FIRE MORTAR AT DIRECT FIRE TARGETS
  - Identify Target
  - Select Target
  - Point Mortar at Target
  - Prepare Ammunition for Firing
  - Load Mortar
  - Aim Mortar
  - Fire Mortar
  - Adjust Fire
6. PERFORM POST-FIRING TASKS
  - Perform Post-Operation Checks
  - Disassemble Weapon
  - Displace Aiming Posts
7. CLEAR/RECOVER FROM MISFIRE

OPERATIONAL FUNCTIONS FOR MEDIUM RANGE MISSILE ARTILLERY SYSTEMS  
(Assumes Missile is on Self Propelled Launcher)

1. PREPARE FOR MARCH ORDER

Receive March Order

Receive Weapon from Assembly and Transport Section

Prepare Self-Propelled Launcher (SPL) for Movement

Ensure Firing Point is Surveyed

2. MOVE TO FIRING POINT

Start Engine

Perform Pre-Operational Vehicle Check

Drive SPL

3. NAVIGATE

Identify Present Location

Identify Destination

Select Travel Route

Estimate Time of Arrival and Fuel Requirements

4. COMMUNICATE

Transmit/Receive Messages

Encode/Decode Messages

Communicate Using Countermeasure Procedures

5. EMPLACE SYSTEM

Position SPL Over Launch Stake

Shut Down Vehicle

Prepare Vehicle For Firing Mode

Inspect Main Missile Assembly (MMA) and Warhead Section  
(WHS) for Damage

Release tie down straps, release traverse, and lockpins

6. PREPARE WEAPON FOR FIRING

Receive Firing Data

Turn on Monitor-Programmer

Conduct self test  
Lay/sight weapon  
Remove protective covers

7. FIRE WEAPON

Arm WHS  
Insert WHS Settings  
Move Firing Device to Firing Pit  
Elevate Missile  
Place Selector in Launch Position  
Clear Area  
Fire Missile

8. CONDUCT POST FIRING INSPECTIONS

9. EXECUTE FAILURE TO FIRE PROCEDURES

Lower Launcher  
Safe the WHS  
Disconnect Firing Device  
Reorient Launcher  
Obtain new orientation from remote theodolite

10. COMPENSATE FOR EQUIPMENT MALFUNCTIONS AND EMERGENCIES

Identify Malfunction  
Identify Source of Malfunction  
Compensate For/Recover From Malfunction

11. PERFORM EMERGENCY DESTRUCTION OF WARHEAD

Insert Command Disablement Code  
Set shape charge to warhead  
Evacuate Area  
Destroy warhead  
Verify destruction

12. DISPLACE SYSTEM

Secure Launcher

Leave Position

## OPERATIONAL FUNCTIONS FOR TOWED HOWITZERS

1. PREPARE FOR MARCH ORDER
  - Receive March Order
  - Perform Pre-Operational Checks
  - Perform Fire Control Alignment
  - Test Gunner's Quadrants
2. DRIVE/MOVE CANNON
  - Drive Vehicle(Non-tactical march)
  - Conduct Tactical March
  - Perform Water Crossing
3. EMPLACE CANNON
  - Uncouple cannon from vehicle
  - Select Position
  - Prepare Position
  - Emplace/Align Collimator
  - Emplace/Align Aiming Posts
4. DISPLACE CANNON
  - Recover Collimator
  - Recover Aiming Posts
  - Couple Cannon to Vehicle
  - Leave Position
5. PREPARE CANNON FOR FIRING
  - Set Up Aiming Circle
  - Establish Azimuth of the Orienting Line
  - Lay Weapon
  - Establish Aiming Points
  - Determine Site to Crest
  - Boresight Weapon/Telescopes
  - Emplace Azimuth Markers
  - Perform Prefire Checks
  - Prepare Range Card

6. FIRE CANNON

- Receive Firing Order
- Prepare Ammunition for Firing
- Set Elevation and Deflection
- Load Cannon
- Fire Cannon
- Unload Cannon

7. FIRE CANNON AT DIRECT FIRE TARGETS

- Identify Target(s)
- Select Target
- Determine Target Range
- Determine Target Lead
- Select Ammunition
- Load Ammunition
- Aim/Sight Weapon
- Fire
- Unload Cannon

8. NAVIGATE

- Identify Present Location
- Identify Destination
- Plot Travel Route
- Estimate Time of Arrival and Travel Requirements

9. COMMUNICATE

- Transmit/Receive Messages
- Encode/Decode Messages
- Communicate Using Countermeasure Procedures

10. DEFEND AGAINST ATTACK

- Deploy to Cover
- Evade Threat

11. COMPENSATE FOR EQUIPMENT MALFUNCTIONS AND EMERGENCIES



Clear Misfire on Cannon

12. CONDUCT POST-MISSION TASKS

Complete Forms

Perform Post-Operation Checks

## OPERATIONAL FUNCTIONS FOR SELF-PROPELLED HOWITZERS

1. PREPARE FOR MARCH ORDER
  - Receive March Order
  - Perform Pre-Operational Checks
  - Perform Fire Control Alignment
  - Test Gunner's Quadrants
  - Prepare Vehicle/personnel for NBC environment
2. DRIVE/MOVE CANNON
  - Drive Vehicle
  - Conduct Tactical March
  - Perform Water Crossing
3. EMLACE CANNON
  - Select Position
  - Prepare Position
  - Emplace/Align Collimator
  - Emplace/Align Aiming Posts
4. DISPLACE CANNON
  - Recover Collimator
  - Recover Aiming Posts
  - Leave Position
5. PREPARE CANNON FOR FIRING
  - Set Up Aiming Circle
  - Establish Azimuth of the Orienting Line
  - Lay Weapon
  - Establish Aiming Points
  - Determine Site to Crest
  - Boresight Weapon/Telescopes
  - Emplace Azimuth Markers
  - Perform Prefire Checks
  - Prepare Range Card

6. FIRE CANNON
  - Receive Firing Order
  - Prepare Ammunition for Firing
  - Set Elevation and Deflection
  - Load Cannon
  - Fire Cannon
  - Unload Cannon
7. FIRE CANNON AT DIRECT FIRE TARGETS
  - Identify Target(s)
  - Select Target
  - Determine Target Range
  - Determine Target Lead
  - Select Ammunition
  - Load Ammunition
  - Aim/Sight Weapon
  - Fire
  - Unload Cannon
8. FIRE CREW SERVED WEAPONS
  - Load Ammunition
  - Identify Target(s)
  - Select Target
  - Determine Target Range
  - Aim/Sight Weapon
  - Fire Weapon
  - Adjust Fire
  - Unload Weapon
9. NAVIGATE
  - Identify Present Location
  - Identify Destination
  - Plot Travel Route
  - Estimate Time of Arrival and Travel Requirements
10. COMMUNICATE

Transmit/Receive Messages  
Encode/Decode Messages  
Communicate Using Countermeasure Procedures

11. DEFEND AGAINST ATTACK

Deploy to Cover  
Evade Threat

12. COMPENSATE FOR EQUIPMENT MALFUNCTIONS AND EMERGENCIES

Identify Malfunction  
Identify Source of Malfunction  
Compensate/Recover from Malfunction  
Evacuate Vehicle  
Extinguish Fire  
Clear Misfire on Crew Served Weapon  
Clear Misfire on Cannon

13. CONDUCT POST-MISSION TASKS

Complete Forms  
Perform Post-Operation Checks

OPERATIONAL FUNCTIONS FOR ROCKET FIELD ARTILLERY SYSTEMS

-TBD

OPERATIONAL FUNCTIONS FOR AIR DEFENSE - MOBILE GUN SYSTEM  
(For self-propelled vehicle only)

1. PREPARE FOR MARCH ORDER
  - Receive March Order
  - Prepare Weapon System for Travel
  - Performs Pre-Operational Vehicle Checks
  - Prepare Vehicle/Personnel for NBC Environment
2. MOVE VEHICLE
  - Start/Stop Engine
  - Drive Vehicle
  - Perform Tactical Movement
  - Perform Water Crossing
3. EMPLACE SYSTEM
  - Select Position
  - Move Vehicle Onto Position
  - Camouflage Vehicle
4. PREPARE WEAPON FOR ENGAGEMENT
  - Designate Observation and Command Posts Primary Target Lines and Sectors of Search
  - Establish Observation and Command Posts
  - Emplace/Start Auxiliary Power Unit
  - Perform Prefire Checks
  - Determine Aiming Points
  - Emplace Target Alert System
  - Boresight Weapon
5. LOAD/RELOAD WEAPON
  - Prepare Ammunition
  - Prepare Weapon for Firing
  - Load Ammunition
6. ACQUIRE TARGET

Search for Target  
Detect/Locate Target  
Identify Friend or Foe

7. ENGAGE AIRCRAFT TARGETS

Select Target  
Determine Target Speed and Range  
Aim/Sight Weapon  
Track Target  
Fire Weapon  
Adjust Fire  
Reset Target Alert System

8. ENGAGE GROUND TARGETS

Select Target  
Determine Target Range  
Aim/Sight Weapon  
Fire Weapon  
Adjust Fire

9. NAVIGATE

Identify Present Location  
Identify Destination  
Plot Travel Route  
Estimate Time of Arrival and Fuel Requirements

10. COMMUNICATE

Transmit/Receive Messages  
Encode/Decode Messages  
Communicate Using Countermeasure Procedures

11. DEFEND AGAINST ATTACK

Deploy to Cover  
Evade Threat

12. DISPLACE SYSTEM

Remove APU

Disconnect/Remove Target Alert System

Leave Position

13. PERFORM POST-MISSION TASKS

Perform Post-Operational Checks

14. COMPENSATE FOR EQUIPMENT MALFUNCTIONS AND EMERGENCIES

Identify Malfunction

Identify Source of Malfunction

Compensate/Recover from Malfunction

Evacuate Vehicle

Extinguish Fires



## OPERATIONAL FUNCTIONS FOR MAN PORTABLE AIR DEFENSE SYSTEMS

### 1. CONDUCT PRE-OPERATIONAL INSPECTION

### 2. PREPARE WEAPON FOR FIRING

Prepare Round

Ready Weapon for Firing

### 3. GET INTO FIRING POSITION

Select Firing Position

Get Into Firing Position

### 4. DETECT/LOCATE TARGET

Search for Target

Detect Target

Identify Friend or Foe

### 5. FIRE WEAPON

Aim Weapon

Track Target

Determine Target Range

Set Superelevation and Lead

Fire Weapon

### 6. CLEAR/RECOVER FROM MISFIRE

### 7. PERFORM POST-FIRING TASKS

Discard Expended Launch Tube

## OPERATIONAL FUNCTIONS FOR ATTACK HELICOPTERS

1. PLAN AND PREPARE FOR MISSION
  - Plan Flight
  - Check Load
  - Calculate Weight and Balance Bearing
  - Prepare Performance Planning Card
  - Enter Preflight Data
  - Conduct Preflight Inspection
  - Perform Engine Start, Run-Up, and Before Take-Off Checks
  - Prepare Vehicle/Personnel For NBC Environment
2. TAXI AND TAKEOFF
  - Perform Ground Taxi
  - Perform Hover Power Check
  - Perform Hovering Flight
  - Perform Takeoff
3. FLY AIRCRAFT TO/FROM MISSION AREA
  - Cruise (Non-Tactical Flight)
  - Perform Tactical Flight
  - Monitor Instruments
  - Perform Holding Procedure
4. NAVIGATE
  - Identify Present Location
  - Identify Destination
  - Select Travel Route
  - Estimate Time of Arrival and Fuel Requirements
5. COMMUNICATE
  - Transmit/Receive Messages
  - Encode/Decode Messages
  - Communicate Using Countermeasure Procedures
6. APPROACH AND LAND AIRCRAFT

Perform Before Landing Checks  
Approach  
Land  
Taxi

7. PERFORM AFTER LANDING TASKS

Conduct Engine Shutdown  
Conduct Post Flight Checks  
Complete Reports and Forms  
Conduct Briefing

8. COMPENSATE FOR INFLIGHT EQUIPMENT MALFUNCTIONS AND  
EMERGENCIES

Identify Malfunction  
Identify Source of Malfunction  
Compensate/Recover from Malfunction  
Extinguish Fire  
Clear Weapon Misfire  
Evacuate Aircraft

9. ACQUIRE TARGETS

Detect/Locate Targets  
Identify Friend or Foe

10. ATTACK TARGET

Maneuver for Attack  
Select Target(s)  
Select Weapon  
Aim/Sight Weapon  
Track Target  
Fire Weapon  
Adjust Fire  
Egress From Attack Position

11. DEFEND AGAINST ATTACK

Deploy to Cover

Identify/Locate Source of Threat/Fire  
Identify/Locate Threat Target Tracking  
Perform Evasive Maneuvers  
Employ ECCM  
Dispense/Disperse Smoke

12. PERFORM RECONNAISSANCE

Move to Recon Area  
Obtain Tactical Information

13. CALL FOR DIRECT SUPPORT

Call for and Adjust Indirect Fire  
Request/Adjust Illumination

## OPERATIONAL FUNCTIONS FOR CARGO HELICOPTERS

### 1. PLAN AND PREPARE FOR MISSION

- Plan Flight
- Check Load
- Calculate Weight and Balance Bearing
- Prepare Performance Planning Card
- Enter Preflight Data
- Conduct Preflight Inspection
- Perform Engine Start, Run-Up, and Before Take-Off Checks
- Prepare Vehicle/Personnel For NBC Environment

### 2. TAXI AND TAKEOFF

- Perform Ground Taxi
- Perform Hover Power Check
- Perform Hovering Flight
- Perform Takeoff

### 3. FLY AIRCRAFT TO/FROM MISSION AREA

- Cruise (Non-Tactical Flight)
- Perform Tactical Flight
- Monitor Instruments
- Perform Holding Procedure

### 4. NAVIGATE

- Identify Present Location
- Identify Destination
- Select Travel Route
- Estimate Time of Arrival and Fuel Requirements

### 5. COMMUNICATE

- Transmit/Receive Messages
- Encode/Decode Messages
- Communicate Using Countermeasure Procedures

### 6. APPROACH AND LAND AIRCRAFT

Perform Before Landing Checks  
Approach  
Land  
Taxi

7. PERFORM AFTER LANDING TASKS

Conduct Engine Shutdown  
Conduct Post Flight Checks  
Complete Reports and Forms  
Conduct Briefing

8. COMPENSATE FOR INFLIGHT EQUIPMENT MALFUNCTIONS AND  
EMERGENCIES

Identify Malfunction  
Identify Source of Malfunction  
Compensate/Recover from Malfunction  
Extinguish Fire  
Clear Weapon Misfire  
Evacuate Aircraft

9. ACQUIRE TARGETS

Detect/Locate Targets  
Identify Friend or Foe

10. ATTACK TARGET

Maneuver for Attack  
Select Target(s)  
Select Weapon  
Aim/Sight Weapon  
Track Target  
Fire Weapon  
Adjust Fire  
Egress From Attack Position

11. DEFEND AGAINST ATTACK

Deploy to Cover

Identify/Locate Source of Threat/Fire  
Identify/Locate Threat Target Tracking  
Perform Evasive Maneuvers  
Employ ECCM  
Dispense/Disperse Smoke

12. LOAD/UNLOAD INTERNAL LOADS

Brief Passengers  
Load Passengers/Cargo  
Unload Passengers/Cargo

13. RAISE/LOWER EXTERNAL LOADS

Attach Load  
Raise Load  
Lower Load

14. PERFORM PARADROP

15. RAPPEL TROOPS

16. PERFORM RECONNAISSANCE

Move to Recon Area  
Obtain Tactical Information

17. CALL FOR DIRECT SUPPORT

Call for and Adjust Indirect Fire  
Request/Adjust Illumination  
Adjust Attack Helicopter Fire

## OPERATIONAL FUNCTIONS FOR UTILITY HELICOPTERS

1. PLAN AND PREPARE FOR MISSION
  - Plan Flight
  - Check Load
  - Calculate Weight and Balance Bearing
  - Prepare Performance Planning Card
  - Enter Preflight Data
  - Conduct Preflight Inspection
  - Perform Engine Start, Run-Up, and Before Take-Off Checks
  - Prepare Vehicle/Personnel For NBC Environment
2. TAXI AND TAKEOFF
  - Perform Ground Taxi
  - Perform Hover Power Check
  - Perform Hovering Flight
  - Perform Takeoff
3. FLY AIRCRAFT TO/FROM MISSION AREA
  - Cruise (Non-Tactical Flight)
  - Perform Tactical Flight
  - Monitor Instruments
  - Perform Holding Procedure
4. NAVIGATE
  - Identify Present Location
  - Identify Destination
  - Select Travel Route
  - Estimate Time of Arrival and Fuel Requirements
5. COMMUNICATE
  - Transmit/Receive Messages
  - Encode/Decode Messages
  - Communicate Using Countermeasure Procedures
6. APPROACH AND LAND AIRCRAFT



Perform Before Landing Checks  
Approach  
Land  
Taxi

7. PERFORM AFTER LANDING TASKS

Conduct Engine Shutdown  
Conduct Post Flight Checks  
Complete Reports and Forms  
Conduct Briefing

8. COMPENSATE FOR INFLIGHT EQUIPMENT MALFUNCTIONS AND  
EMERGENCIES

Identify Malfunction  
Identify Source of Malfunction  
Compensate/Recover from Malfunction  
Extinguish Fire  
Clear Weapon Misfire  
Evacuate Aircraft

9. ACQUIRE TARGETS

Detect/Locate Targets  
Identify Friend or Foe

10. ATTACK TARGET

Maneuver for Attack  
Select Target(s)  
Select Weapon  
Aim/Sight Weapon  
Track Target  
Fire Weapon  
Adjust Fire  
Egress From Attack Position

11. DEFEND AGAINST ATTACK

Deploy to Cover

Identify/Locate Source of Threat/Fire  
Identify/Locate Threat Target Tracking  
Perform Evasive Maneuvers  
Employ ECCM  
Dispense/Disperse Smoke

12. LOAD/UNLOAD INTERNAL LOADS

Brief Passengers  
Load Passengers/Cargo  
Unload Passengers/Cargo

13. RAISE/LOWER EXTERNAL LOADS

Attach Load  
Raise Load  
Lower Load

14. PERFORM PARADROP

15. RAPPEL TROOPS

16. PERFORM RECONNAISSANCE

Move to Recon Area  
Obtain Tactical Information

17. CALL FOR DIRECT SUPPORT

Call for and Adjust Indirect Fire  
Request/Adjust Illumination  
Adjust Attack Helicopter Fire

## OPERATIONAL FUNCTIONS FOR SCOUT HELICOPTERS

1. PLAN AND PREPARE FOR MISSION
  - Plan Flight
  - Check Load
  - Calculate Weight and Balance Bearing
  - Prepare Performance Planning Card
  - Enter Preflight Data
  - Conduct Preflight Inspection
  - Perform Engine Start, Run-Up, and Before Take-Off Checks
  - Prepare Vehicle/Personnel For NBC Environment
2. TAXI AND TAKEOFF
  - Perform Ground Taxi
  - Perform Hover Power Check
  - Perform Hovering Flight
  - Perform Takeoff
3. FLY AIRCRAFT TO/FROM MISSION AREA
  - Cruise (Non-Tactical Flight)
  - Perform Tactical Flight
  - Monitor Instruments
  - Perform Holding Procedure
4. NAVIGATE
  - Identify Present Location
  - Identify Destination
  - Select Travel Route
  - Estimate Time of Arrival and Fuel Requirements
5. COMMUNICATE
  - Transmit/Receive Messages
  - Encode/Decode Messages
  - Communicate Using Countermeasure Procedures
6. APPROACH AND LAND AIRCRAFT

Perform Before Landing Checks  
Approach  
Land  
Taxi

7. PERFORM AFTER LANDING TASKS

Conduct Engine Shutdown  
Conduct Post Flight Checks  
Complete Reports and Forms  
Conduct Briefing

8. COMPENSATE FOR INFLIGHT EQUIPMENT MALFUNCTIONS AND  
EMERGENCIES

Identify Malfunction  
Identify Source of Malfunction  
Compensate/Recover from Malfunction  
Extinguish Fire  
Clear Weapon Misfire  
Evacuate Aircraft

9. ACQUIRE TARGETS

Detect/Locate Targets  
Identify Friend or Foe

10. ATTACK TARGET

Maneuver for Attack  
Select Target(s)  
Select Weapon  
Aim/Sight Weapon  
Track Target  
Fire Weapon  
Adjust Fire  
Egress From Attack Position

11. DEFEND AGAINST ATTACK

Deploy to Cover

Identify/Locate Source of Threat/Fire  
Identify/Locate Threat Target Tracking  
Perform Evasive Maneuvers  
Employ ECCM  
Dispense/Disperse Smoke

12. PERFORM RECONNAISSANCE

Move to Recon Area  
Obtain Tactical Information

13. CALL FOR DIRECT SUPPORT

Call for and Adjust Indirect Fire  
Request/Adjust Illumination  
Adjust Attack Helicopter Fire

## OPERATIONAL FUNCTIONS FOR LIGHT AND HEAVY CARGO TRANSPORT TRUCKS

### 1. PLAN AND PREPARE MISSION

- Receive/Review Order
- Complete Vehicle Record Forms
- Perform Pre-Operational Checks
- Camouflage Vehicle
- Mark Vehicle

### 2. PREPARE LOAD

- Observe/Check Loading of Cargo/Passengers
- Brief Passengers
- Secure Load
- Couple Trailer
- Load Vehicle

### 3. DRIVE VEHICLE

- Start Vehicle
- Drive Vehicle
- Drive Vehicle in Motor March or Convoy

### 4. DEFEND AGAINST ATTACK

- Deploy to Cover
- Perform Evasive Maneuvers

### 5. COMPENSATE FOR EQUIPMENT MALFUNCTIONS AND EMERGENCIES

- Perform Self-Recovery of Vehicle

### 6. LOAD/UNLOAD VEHICLE

- Load Cargo/Passengers
- Unload Cargo/Passengers

### 7. PERFORM POST-MISSION PROCEDURES

- Park Vehicle
- Perform Post-Operational Checks
- Complete Vehicle Record Forms

#### 4.2.3 - Functions by Mission

The Functions by Mission Library will be similar to the Missions by System Type Library. It will include a listing of all functions which have been entered into the SPREA. These functions are assigned to missions within system types, within mission areas.

When the analyst selects a specific mission, a menu will be displayed that will allow him or her to view the resident functions within that mission. Each of these functions will have been pulled from the Functions by Mission Library and the list will be sorted into roughly sequential order (taking into account that the tasks from some of the functions may be intertwined). If the analyst wishes to delete or add functions to the ones which are listed for the mission, the SPREA will allow him or her to see a complete list of functions that are in this library.

If the analyst chooses to enter a new function, the SPREA will prompt him or her to ensure that all of the necessary data is entered. One of the required parameters is a list of the function's tasks. If the analyst chooses, he or she will be able to view the Functions and Tasks by System Type Library to build the list of previously entered tasks.

Note: The numbers listed in the table refer to the numbers assigned to each function listed in the Functions and Tasks by System Type Library.

# TYPE SYSTEM

Infantry & Armor System Missions	Infantry Fighting Vehicles	Antitank Vehicles	Rifles		Man Portable Antitank	Man Portable Indirect Fire	Tanks	Cavalry Fighting Vehicles
			Automatic Weapons	Grenade Launchers				
Destroy Enemy Troops	1,2,4,5,6, 8,11,3	1,2,4,5,6, 8,11,3	1-7		-	1-7	1,2,4,5,6, 8,11,3	1,2,4,5,6, 8,11,3
Destroy Fixed Emplacements	1,2,4,5,6 8,11,3	1,2,4,5,6 8,11,3	-		1-7	1-7	1,2,4,5,6 8,11,3	1,2,4,5,6 8,11,3
Destroy Enemy Armored Vehicles	1,2,4,5,6 8,11,3	1,2,4,5,6 8,11,3	-		1-7	1-7	1,2,4,5,6 8,11,3	1,2,4,5,6 8,11,3
Delay & Suppress Enemy Activity	1,2,3,4,5, 6,7,8,9, 10,11,13	1,2,3,4,5, 6,7,8	1-7		1-7	1-7	1,2,3,4,5, 6,7,8,9, 10,11	1,2,3,4,5, 6,7,8,9, 10,11
Escort/Screen Friendly Forces	1,2,3,4, 8,10,11		-		-	-	1,2,3,4, 8,10,11	1,2,3,4, 8,10,11
Seize & Occupy Terrain	1,2,3,4, 5,6,7,8, 9,10,11		1-7		1-7	1-7	1,2,3,4, 5,6,7,8, 9,10,11	1,2,3,4, 5,6,7,8, 9,10,11
Perform Reconnaissance	1,2,3,4, 8,10,11		-		-	-	1,2,3,4, 8,10,11	1,2,3,4, 8,10,11
Transport Combat Troops	2,3,4,9, 10,11	-	-		-	-	-	2,3,4,9, 10,11

Note: Data entries are function numbers.



# TYPE SYSTEM

<u>Fire Support Missions</u>	<u>Medium Range Missile</u>	<u>Towed Howitzers</u>	<u>SP Howitzer</u>	<u>Rockets</u>
Destroy Enemy Maneuver Forces	1-10,12	1-6,8,9,11,12	1-6,8,9, 11,12	TBD
Destroy Enemy Fire Support Forces	1-10,12	1-6,8,9,11,12	1-6,8,9,11,12	TBD
Delay & Suppress Enemy Activity	-	5,6,7,10,11	5,6,7,10,11	TBD
Provide Illumination	-	1-6,8,9,11,12	1-6,8,9,11,12	-
Conceal Friendly Forces by Making Smoke	-	1-6,8,9,11,12	1-6,8,9,11,12	-

# TYPE SYSTEM

<u>Air Defense Missions</u>	<u>Mobile Gun</u>	<u>Man Portable</u>
Destroy Enemy Aircraft	1-7,9,10,12,13,14	1-7
Destroy Enemy (ground) Troops	8,11,14	-
Destroy Enemy Armored Vehicles	8,11,14	-

# TYPE SYSTEM

<u>Aviation Missions</u>	<u>Attack Helicopters</u>	<u>Utility Helicopters</u>	<u>Cargo Helicopters</u>	<u>Scout Helicopters</u>
Destroy Enemy Troops	1-10,13	1-8,9,10,17	1-8,9,10,17	1-8,9,10,13
Destroy Enemy Fixed Emplacements	1-10,13	-	-	-
Destroy Enemy Armored Vehicles	1-10,13	-	-	-
Destroy Enemy Helicopters	1-10,13	-	-	-
Delay/Suppress Enemy Activity	1-11,13	1-8,9,10,11,17	1-8,9,10,11,17	1-8,9,10,11,13
Escort/Screen Friendly forces	1-8,13	-	-	-
Perform Reconnaissance	1-8,12,13	1-8,16,17	1-8,16,17	1-8,12,13
Transport Combat Troops	-	1-8,12,15,17	1-8,12,15,17	-
Transport Logistical Supplies	-	1-8,12,13,14,17	1-8,12,13,14,17	-
Evacuate Casualties	-	1-8,12,13,17	1-8,12,13,17	-

# TYPE SYSTEM

<u>Combat Service Support Missions</u>	<u>Light Trucks</u>	<u>Heavy Trucks</u>
Transport Personnel	1, 2, 3, 4, 5, 6, 7	1, 2, 3, 4, 5, 6, 7
Transport Cargo	1, 2, 3, 4, 5, 6, 7	1, 2, 3, 4, 5, 6, 7

#### 4.2.4 - Conditions by System Type

The Conditions by System Type Library is listed on the succeeding pages. This Library is extremely long, but many of the conditions are simply repeated across system types.

Within each system type, conditions are divided into two sets. The first set lists the conditions which are typically used to set performance requirements. The second set lists "additional" conditions which are sometimes used to set performance requirements. Within each of these two general sets, conditions are further broken down into four classes as follows:

- Environmental conditions
- Terrain conditions
- Target or threat-related conditions
- Conditions related to friendly forces

For conditions which are quantitatively measured (e.g., target range), users will be allowed to describe the increments (e.g., 0-1000 meters, 1000-5000 meters, 5000-10000 meters) which will be used to describe the condition categories.

Finally, it must be stressed that the purpose of the conditions taxonomy is to define the conditions that will be used to set performance requirements. Different performance requirements will be applicable in different conditions.

## CONDITIONS FOR INFANTRY FIGHTING VEHICLES

### ENVIRONMENTAL CONDITIONS

#### DAY/NIGHT

- Day
- Night

#### VISIBILITY TYPE

- Clear
- Fog
- Haze
- Smoke
- Other (To be specified by user)

#### CLIMATE TYPE

- Hot/Dry
- Hot/Humid
- Basic/High Humid
- Basic/Hot
- Basic/Cold
- Cold
- Severe Cold

#### ELECTROMAGNETIC HAZARDS

- With electromagnetic hazards
- Without electromagnetic hazards

### TERRAIN CONDITIONS

#### ROAD TYPE

- Primary
- secondary
- cross country

#### NATURAL OBSTACLES

- Rivers and streams
- Forests
- Mountains
- Lakes and Ponds
- Swamps, Marshes and Bogs
- Other (To be specified by user)

#### SIDE SLOPE OF OBSTACLE TO BE CROSSED

(In per cent or in degrees in increments defined by user)

#### GRADE SLOPE OF OBSTACLE TO BE CROSSED

(In per cent or in degrees in increments defined by user)

#### HORIZONTAL GAP OF DITCHES TO BE CROSSED

(in feet in increments defined by user)

#### SIZE OF VERTICAL WALLS TO BE CROSSED

(in feet in increments defined by user)

#### TARGET/THREAT-RELATED CONDITIONS

##### PROTECTIVE GEAR LEVEL

- MOPP Level 0
- MOPP Level 1
- MOPP Level 2
- MOPP Level 3
- MOPP Level 4
- Others(to be specified by user)

##### TARGET RANGE

(in meter increments defined by user)

##### ELECTROMAGNETIC PULSE (EMP)

- With EMP
- Without EMP

TYPE OF ELECTRONIC WARFARE PRESENT

- Beaconing
- Jamming
- Interference
- All of above
- None of above

CONDITIONS RELATED TO FRIENDLY FORCES

VEHICLE MOVEMENT STATUS

Moving  
Stationary

ADDITIONAL CONDITIONS

ENVIRONMENTAL CONDITIONS

SPECIAL ENVIRONMENTS

Mountain  
Jungle  
Desert  
Winter  
Amphibious

WIND DIRECTION TYPE

Headwind  
Tailwind  
Cross wind  
No wind

WIND DIRECTION-MEASURED

(in mils from gun azimuth in increments selected by user)



WIND VELOCITY

(in knots or in miles per hour in increments selected by user)

PRESSURE

(in millibars in increments selected by user)

TEMPERATURE

(in degrees KELVIN, CELSIUS, or FAHRENHEIT in increments selected by user)

HEIGHT ABOVE SEA LEVEL

(in meters in increments selected by user)

PRECIPITATION

Clear

Snow

Ice

Rain

VISIBILITY (In meters)

TERRAIN CONDITIONS

ROAD SURFACE TYPE

-All weather road (concrete or bituminous concrete)

-Limited weather road (crushed rock, waterbound macadam, gravel)

-Fair Weather road (natural or stabilized soil, sand or clay, shell, cinder)

CROSS COUNTRY SURFACE TYPE

-Sand

-Bare packed ground

-Light vegetation

-Dense vegetation

LOAD BEARING CAPACITY OF GROUND/ROAD

(In tons in increments specified by user)

GROUND SURFACE STATUS

Dry

Wet

Mud

Ice

Snow

Dust

DEPTH OF WATER OBSTACLE

(in feet in increments defined by user)

CURRENT OF RIVER TO BE FORDED

(in knots or miles per hour in increments defined by the user)

TYPE OF RAIL, BRIDGE, OR TUNNEL

(To be specified by user)

CURVATURE OF ROAD

(Radius in meters in increments to be specified by user)

THREAT/TARGET CONDITIONS

GENERAL TARGET/THREAT TYPES

Tank

Armored personnel carrier

Unarmored vehicle

Helicopter

Fixed wing aircraft

Artillery or air defense systems

Troops

Others (to be specified by user)

THREAT TANK AND ASSAULT GUN TYPES

T-62 Medium Tank

T-64 Medium Tank

T-55 Medium Tank

T-72 Medium Tank

SU-85 Assault gun

PT-76 Light Amphibious Tank

Others (to be specified by user)

THREAT ARMORED VEHICLES

BMP-1

BTR 50-P

BRDM-2

BTR 60-P

BMD

Others (To be specified by user)

THREAT TROOP WEAPON TYPES

Assault rifle, AKMS

Antitank grenade launcher, RPG-7

7.62 light machine gun

7.62 heavy machine gun

82-mm mortar

82-mm recoilless gun

antitank gun SPG-9

SAGGER antitank guided missile

Others (To be specified by user)

THREAT HELICOPTER TYPES

Mi-8 HIP C Attack Helicopter

Mi-8 HIP E Attack Helicopter

Mi-8 HIP F Attack Helicopter

HIND A Attack Helicopter

HIND B Attack Helicopter

HIND C Attack Helicopter

HIND D Attack Helicopter

HIND E Attack Helicopter  
Mi-2 HOPLITE Transport Helicopter  
Mi-4 HOUND Transport Helicopter  
Mi-6 HOOK Transport Helicopter  
Others (Defined by User)

THREAT FIXED WING AIRCRAFT

Su-15 Fighter Interceptor  
Mig-25 FOXBAT Fighter Interceptor  
MIG-23 FLOGGER-B Tactical Fighter  
MIG-21 FISHBED Tactical Fighter  
Su-11 FISHPOT Fighter Interceptor  
Su-7 FITTER B Fighter Bomber  
Su-24 FENCER Fighter Bomber  
MIG-27 FLOGGER D Fighter Bomber  
Su-25 FROGFOOT Fighter Bomber  
Others (Defined by User)

TYPE OF THREAT ATTACK

Air Attack  
Indirect Fire Attack  
Sniper Fire Attack  
Tank/armored vehicle attack  
NBC Attack  
Attack with Light Antitank Weapon  
Others (To be specified by user)

GROUND TARGET SPEED

(In knots or in miles per hour in increments specified by user)

DIRECTED ENERGY WEAPON

Directed Energy Weapons Present  
Directed Energy Weapons Absent

THREAT OBSTACLES

Minefield

Other (To be specified by user)

MOVEMENT STATUS OF GROUND TARGETS

Moving

Stationary

RANGE OF GROUND TARGETS

(in meters in increments selected by user)

ASPECT OF GROUND TARGET

Frontal

Flanking

Oblique

NUMBER OF GROUND TARGETS

(To be specified by user)

TARGET AIRCRAFT COURSE

Crossing level

Crossing diving

Incoming diagonal

Outgoing

Hovering

RANGE OF TARGET AIRCRAFT

(In meters in increments specified by user)

TARGET AIRCRAFT SPEED

(In knots or in miles per hour in increments specified by user )

NUMBER OF AIRBORNE TARGETS

(To be specified by user)

TARGET EXPOSURE TIME

(In seconds in increments specified by user)

TYPE OF THREAT TARGET ACQUISITION

Visual

Infrared radar/sensor

Sound/flash radar

Artillery locating radar

Air defense radar

Movement sensor

Pressure sensor

Radio direction finding system

Others (to be specified by user)

CONDITIONS RELATED TO FRIENDLY FORCES

FIRE DISTRIBUTION TYPE

Point

Area

FIRE HEIGHT

Grazing

Plunging

TYPE OF GUNNERY

Precision

Battlesight

MULTIPLE TARGET FIRE PATTERNS

Frontal

Crossfire

Depth

WEAPON TYPES

M231 Firing Port Weapon

25mm automatic gun

M257 Smoke grenade launchers

TOW

M240 Machine gun

Others (To be specified by user)

RATE OF FIRE

Single Shot

Low Rate

High Rate

TYPE OF SIGHT

Integrated Sight Unit

Auxiliary Sight

Ring Sight

Naked Eye

AN/PVS 5 Night Vision Goggles

AN/VVS 2 Night Vision Viewer

-Others (To be specified by user)

AMMUNITION TYPE FOR AUTOMATIC GUN

high explosive incendiary-tracer (HEI-T)

armor piercing discarding Sabot -tracer (APDS-T)

target practice-tracer

Others (To be specified by user)

METHODS FOR DETERMINING TARGET RANGE

Naked eye

Binocular

Stadia

Other (to be specified by user)

TYPE OF POWER FOR FIRE CONTROL

Vehicle

Battery

SIGHT MODES

Day

Night

CONDITION OF VEHICLE HATCHES

Buttoned-up

Open

COMMUNICATION MEDIUM

-Intercom

-Squad radio

-FM radio

-Wire

-Visual

-Voice

-Others (To be specified by user)

COMMUNICATION MODE

-Messages encoded and decoded

-Normal message traffic

TYPE OF HIGHER LEVEL UNIT OPERATION BEING SUPPORTED

Offensive

Movement To Contact

Hasty Attack

Deliberate Attack

Exploitation

Pursuit

Reconnaissance In Force

Raid

Feint

Demonstration

Defensive

Covering Force

Main Battle

Deep Attack

Rear Area Operations



## Retrograde Operations

### TYPE OF MOVEMENT WHEN NOT IN CONTACT WITH ENEMY

Traveling

Traveling Overwatch

Bounding Overwatch

### FORMATION TYPE

Column

Line

Echelon

Vee

Wedge

Herring Bone

Coil

Laager

Others (To be specified by user)

### TYPE OF OFFENSIVE OPERATION

Movement to contact

Assault

Mounted assault with tanks

Mounted assault without tanks

Dismounted assault

Passage of lines

Others (To be specified by user)

### TYPE OF DEFENSIVE OPERATION

Disengagement

Aerial defense

Counterattack

Withdrawal

Delay

Reserve

Others (to be specified by user)

COMBAT PATROL MISSIONS

reconnaissance

route

zone

area

ambush

point

area

antiarmor

security/screen

raid

TABLE C-2 CONDITIONS TAXONOMY FOR ANTITANK VEHICLES

CONDITIONS TYPICALLY USED IN SETTING PERFORMANCE REQUIREMENTS

ENVIRONMENTAL CONDITIONS

DAY/NIGHT

- Day
- Night

VISIBILITY TYPE

- Clear
- Fog
- Haze
- Smoke
- Other (To be specified by user)

CLIMATE TYPE

- Hot/Dry
- Hot/Humid
- Basic/High Humid
- Basic/Hot
- Basic/Cold
- Cold
- Severe Cold

ELECTROMAGNETIC HAZARDS

- With electromagnetic hazards
- Without electromagnetic hazards

TERRAIN CONDITIONS

ROAD TYPE

- Primary

- secondary
- cross country

#### NATURAL OBSTACLES

- Rivers and Streams
- Forests
- Mountains
- Lakes and Ponds
- Swamps, Marshes and Bogs
- Other (To be specified by user)

#### SIDE SLOPE OF OBSTACLE TO BE CROSSED

(In per cent or in degrees in increments defined by user)

#### GRADE SLOPE OF OBSTACLE TO BE CROSSED

(In per cent or in degrees in increments defined by user)

#### HORIZONTAL GAP OF DITCHES TO BE CROSSED

(in feet in increments defined by user)

#### SIZE OF VERTICAL WALLS TO BE CROSSED

(in feet in increments defined by user)

#### TARGET/THREAT-RELATED CONDITION

##### PROTECTIVE GEAR LEVEL

- MOPP Level 0
- MOPP Level 1
- MOPP Level 2
- MOPP Level 3
- MOPP Level 4
- Others(to be specified by user)

##### TARGET RANGE

(in meter increments defined by user)

ELECTROMAGNETIC PULSE (EMP)

- With EMP
- Without EMP

TYPE OF ELECTRONIC WARFARE PRESENT

- Beaconing
- Jamming
- Interference
- All of above
- None of above

CONDITIONS RELATED TO FRIENDLY FORCES

VEHICLE MOVEMENT STATUS

- Moving
- Stationary

ADDITIONAL CONDITIONS

ENVIRONMENTAL CONDITIONS

SPECIAL ENVIRONMENTS

- Mountain
- Jungle
- Desert
- Winter
- Amphibious

WIND DIRECTION TYPE

- Headwind
- Tailwind
- Cross wind
- No wind

WIND DIRECTION-MEASURED

(in mils from gun azimuth in increments selected by user)

WIND VELOCITY

(in knots or in miles per hour in increments selected by user)

PRESSURE

(in millibars in increments selected by user)

TEMPERATURE

(in degrees KELVIN, CELSIUS, or FAHRENHEIT in increments selected by user)

HEIGHT ABOVE SEA LEVEL

(in meters in increments selected by user)

PRECIPITATION

Clear

Snow

Ice

Rain

VISIBILITY (In meters)

TERRAIN CONDITIONS

ROAD SURFACE TYPE

-All weather road (concrete or bituminous concrete)

-Limited weather road (crushed rock, waterbound macadam, gravel)

-Fair Weather road (natural or stabilized soil, sand or clay, shell, cinder)

CROSS COUNTRY SURFACE TYPE

-Sand

- Bare packed ground
- Light vegetation
- Dense vegetation

LOAD BEARING CAPACITY OF GROUND/ROAD  
(In tons in increments specified by user)

GROUND SURFACE STATUS

Dry  
Wet  
Mud  
Ice  
Snow  
Dust

DEPTH OF WATER OBSTACLE  
(in feet in increments defined by user)

CURRENT OF RIVER TO BE FORDED  
(in knots or miles per hour in increments defined by the user)

TYPE OF RAIL, BRIDGE, OR TUNNEL  
(To be specified by user)

CURVATURE OF ROAD  
(Radius in meters in increments to be specified by user)

THREAT/TARGET CONDITIONS

GENERAL TARGET THREAT TYPES

Tank  
Armored personnel carrier  
Unarmored vehicle  
Helicopter

Fixed wing aircraft  
Artillery or air defense systems  
Troops  
Others (to be specified by user)

#### THREAT TANK AND ASSAULT GUN TYPES

T-62 Medium Tank  
T-64 Medium Tank  
T-55 Medium Tank  
T-72 Medium Tank  
SU-85 Assault gun  
PT-76 Light Amphibious Tank  
Others (to be specified by user)

#### THREAT ARMORED VEHICLES

BMP-1  
BTR 50-P  
BRDM-2  
BTR 60-P  
BMD  
Others (To be specified by user)

#### THREAT TROOP WEAPON TYPES

Assault rifle, AKMS  
Antitank grenade launcher, RPG-7  
7.62 light machine gun  
7.62 heavy machine gun  
82-mm mortar  
82-mm recoilless gun  
antitank gun SPG-9  
SAGGER antitank guided missile  
Others (To be specified by user)

#### THREAT HELICOPTER TYPES

Mi-8 HIP C Attack Helicopter  
Mi-8 HIP E Attack Helicopter



Mi-8 HIP F Attack Helicopter  
HIND A Attack Helicopter  
HIND B Attack Helicopter  
HIND C Attack Helicopter  
HIND D Attack Helicopter  
HIND E Attack Helicopter  
Mi-2 HOPLITE Transport Helicopter  
Mi-4 HOUND Transport Helicopter  
Mi-6 HOOK Transport Helicopter  
Others (Defined by User)

#### THREAT FIXED WING AIRCRAFT

Su-15 Fighter Interceptor  
Mig-25 FOXBAT Fighter Interceptor  
MIG-23 FLOGGER-B Tactical Fighter  
MIG-21 FISHBED Tactical Fighter  
Su-11 FISHPOT Fighter Interceptor  
Su-7 FITTER B Fighter Bomber  
Su-24 FENCER Fighter Bomber  
MIG-27 FLOGGER D Fighter Bomber  
Su-25 FROGFOOT Fighter Bomber  
Others (Defined by User)

#### TYPE OF THREAT ATTACK

Air Attack  
Indirect Fire Attack  
Sniper Fire Attack  
Tank/armored vehicle attack  
NBC Attack  
Attack with Light Antitank Weapon  
Others (To be specified by user)

#### TARGET AIRCRAFT COURSE

Crossing level  
Crossing diving  
Incoming diagonal

Outgoing  
Hovering

RANGE OF TARGET AIRCRAFT

(In meters in increments specified by user)

TARGET AIRCRAFT SPEED

(In knots or in miles per hour in increments specified by user )

NUMBER OF AIRBORNE TARGETS

(To be specified by user)

TARGET EXPOSURE TIME

(In seconds in increments specified by user)

GROUND TARGET SPEED

(In knots or in miles per hour in increments specified by user)

DIRECTED ENERGY WEAPON

Directed Energy Weapons Present

Directed Energy Weapons Absent

THREAT OBSTACLES

Minefield

Other (To be specified by user)

MOVEMENT STATUS OF GROUND TARGETS

Moving

Stationary

RANGE OF GROUND TARGETS

(in meters in increments selected by user)

ASPECT OF GROUND TARGET

Frontal

Flanking

Oblique

NUMBER OF GROUND TARGETS

(To be specified by user)

TYPE OF THREAT TARGET ACQUISITION

Visual

Infrared radar/sensor

Sound/Flash radar

Artillery locating radar

Air defense radar

Movement sensor

Pressure sensor

Radio direction finding system

Others (to be specified by user)

CONDITIONS RELATED TO FRIENDLY FORCES

FIRE DISTRIBUTION TYPE

Point

Area

FIRE HEIGHT

Grazing

Plunging

TYPE OF SIGHT

Naked Eye

AN/PVS 5 Night Vision Goggles

TOW nightsight

-Others (To be specified by user)

MULTIPLE TARGET FIRE PATTERNS

Frontal

Crossfire

Depth

TOW FIRING CONDITIONS

Over water greater than 1100 meters

Over electric wires

In Smoke

Normal

WEAPONS TYPES

Dual launcher TOW

M60 machine gun

Smoke grenade launcher

Others (To be specified by user)

TYPE OF FOV

Wide

Narrow

AERIAL ENGAGEMENT METHOD

Active

Passive

CONDITION OF VEHICLE HATCHES

Buttoned-up

Open

COMMUNICATION MEDIUM

-Intercom

-Squad radio

-FM radio

-Wire

-Visual

-Voice

-Others (To be specified by user)

COMMUNICATION MODE

-Messages encoded and decoded

-Normal message traffic

TYPE OF HIGHER LEVEL UNIT OPERATION BEING SUPPORTED

Offensive

Movement To Contact

Hasty Attack

Deliberate Attack

Exploitation

Pursuit

Reconnaissance In Force

Raid

Feint

Demonstration

Defensive

Covering Force

Main Battle

Deep Attack

Rear Area Operations

Retrograde Operations

TYPE OF MOVEMENT WHEN NOT IN CONTACT WITH ENEMY

Traveling

Traveling Overwatch

Bounding Overwatch

FORMATION TYPE

Column

Line

Echelon

Vee

Wedge

Herring Bone

Coil

Laager

Others (To be specified by user)

#### TYPE OF OFFENSIVE OPERATION

Movement to contact

Assault

Mounted assault with tanks

Mounted assault without tanks

Dismounted assault

Passage of lines

Others (To be specified by user)

#### TYPE OF DEFENSIVE OPERATION

Disengagement

Aerial defense

Counterattack

Withdrawal

Delay

Reserve

Others (to be specified by user)

#### COMBAT PATROL MISSIONS

reconnaissance

route

zone

area

ambush

point

area

antiarmor

security/screen

raid

TABLE C-3 CONDITIONS TAXONOMY FOR MAN PORTABLE MORTARS

CONDITIONS TYPICALLY USED IN SETTING PERFORMANCE REQUIREMENTS

ENVIRONMENTAL CONDITIONS

DAY/NIGHT

- Day
- Night

VISIBILITY TYPE

- Clear
- Fog
- Haze
- Smoke
- Other (To be specified by user)

CLIMATE TYPE

- Hot/Dry
- Hot/Humid
- Basic/High Humid
- Basic/Hot
- Basic/Cold
- Cold
- Severe Cold

TERRAIN CONDITIONS

LOAD BEARING CAPACITY OF GROUND

(In tons in increments specified by user)

GROUND SURFACE STATUS

Dry

Wet  
Mud  
Ice  
Snow  
Dust

#### SIDE SLOPE OF TERRAIN

(In percent or in degrees in increments defined by user)

#### GRADE SLOPE OF TERRAIN

(In percent or in degrees in increments defined by user)

### TARGET/THREAT-RELATED CONDITIONS

#### PROTECTIVE GEAR LEVEL

- MOPP Level 0
- MOPP Level 1
- MOPP Level 2
- MOPP Level 3
- MOPP Level 4
- Others(to be specified by user)

#### TARGET RANGE

(in meter increments defined by user)

### CONDITIONS RELATED TO FRIENDLY FORCES

#### FIRING MODE

- Target Observable
- Target Not Observable

#### QUADRANT ELEVATIONS

(In mils in increments specified by user)



FIRING INTENSITY

-Maximum

-Sustained

ADDITIONAL CONDITIONS

ENVIRONMENTAL CONDITIONS

SPECIAL ENVIRONMENTS

Mountain

Jungle

Desert

Winter

Amphibious

WIND DIRECTION TYPE

Headwind

Tailwind

Cross wind

No wind

WIND DIRECTION-MEASURED

(in mils from gun azimuth in increments selected by user)

WIND VELOCITY

(in knots or in miles per hour in increments selected by user)

PRESSURE

(in millibars in increments selected by user)

TEMPERATURE

(in degrees KELVIN, CELSIUS, or FAHRENHEIT in increments selected by user)

HEIGHT ABOVE SEA LEVEL

(in meters in increments selected by user)

PRECIPITATION

Clear

Snow

Ice

Rain

VISIBILITY (In meters)

TERRAIN CONDITIONS

None

THREAT/TARGET CONDITIONS

TYPE OF THREAT TARGET ACQUISITION

Visual

Sound/Flash radar

Artillery locating radar

Others (to be specified by user)

CONDITIONS RELATED TO FRIENDLY FORCES

PLATFORM

-Mounted

-Ground

METHOD FOR LAYING MORTAR

Normal

Reciprocal

FIRE PATTERN TYPE

Traversing

Searching  
Other

BORESIGHT MECHANISM

M45  
M115  
Other

AMMUNITION TYPE

High explosive  
Smoke  
Illumination  
Training practice  
White phosphorous  
Others (to be specified by user)

METHOD FOR SETTING DEFLECTION

Sight Box  
Distant aiming point

TYPE OF HIGHER LEVEL UNIT OPERATION BEING SUPPORTED

Offensive

Movement To Contact  
Hasty Attack  
Deliberate Attack  
Exploitation  
Pursuit  
Reconnaissance In Force  
Raid  
Feint  
Demonstration

Defensive

Covering Force  
Main Battle  
Deep Attack  
Rear Area Operations

## Retrograde Operations

### TYPE OF SIGHT

Naked Eye

Night Vision Goggles

Others (To be specified by user)

### TABLE C-4 CONDITIONS TAXONOMY FOR GRENADE LAUNCHER

### CONDITIONS TYPICALLY USED IN SETTING PERFORMANCE REQUIREMENTS

#### ENVIRONMENTAL CONDITIONS

##### DAY/NIGHT

-Day

-Night

##### VISIBILITY TYPE

-Clear

-Fog

-Haze

-Smoke

-Other (To be specified by user)

##### CLIMATE TYPE

-Hot/Dry

-Hot/Humid

-Basic/High Humid

-Basic/Hot

-Basic/Cold

-Cold

-Severe Cold

#### TERRAIN CONDITIONS

None

#### TARGET/THREAT-RELATED CONDITIONS

PROTECTIVE GEAR LEVEL

- MOPP Level 0
- MOPP Level 1
- MOPP Level 2
- MOPP Level 3
- MOPP Level 4
- Others(to be specified by user)

TARGET RANGE

(in meter increments defined by user)

CONDITIONS RELATED TO FRIENDLY FORCES

ADDITIONAL CONDITIONS

ENVIRONMENTAL CONDITIONS

SPECIAL ENVIRONMENTS

Mountain  
Jungle  
Desert  
Winter  
Amphibious

WIND DIRECTION TYPE

Headwind  
Tailwind  
Cross wind  
No wind

WIND VELOCITY

(in knots or in miles per hour in increments selected by user)

TEMPERATURE

(in degrees KELVIN, CELSIUS, or FAHRENHEIT in increments selected by user)

HEIGHT ABOVE SEA LEVEL

(in meters in increments selected by user)

PRECIPITATION

Clear

Snow

Ice

Rain

VISIBILITY (In meters)

TERRAIN CONDITIONS

None

THREAT/TARGET CONDITIONS

TARGET TYPE

Bunker opening

Window opening

Vehicle/Weapons emplacement

Troops in open

TYPE OF THREAT TARGET ACQUISITION

Visual

Infrared radar/sensor

Sound/Flash radar

Others (to be specified by user)

CONDITIONS RELATED TO FRIENDLY FORCES

FIRING POSITION

Foxhole

Prone

Kneeling

AMMUNITION TYPE

Dual Purpose

High explosive

Training practice

Pyrotechnic signal and spotting

Others (to be specified by user)

TYPE OF SIGHT

Naked Eye

AN/PVS 4 Night Vision Sight

Others (To be specified by user)

TABLE C-5 CONDITIONS TAXONOMY FOR M-16A1 RIFLE

CONDITIONS TYPICALLY USED IN SETTING PERFORMANCE REQUIREMENTS

ENVIRONMENTAL CONDITIONS

DAY/NIGHT

- Day
- Night

VISIBILITY TYPE

- Clear
- Fog
- Haze
- Smoke
- Other (To be specified by user)

CLIMATE TYPE

- Hot/Dry
- Hot/Humid
- Basic/High Humid
- Basic/Hot
- Basic/Cold
- Cold
- Severe Cold

TERRAIN CONDITIONS

None

TARGET/THREAT-RELATED CONDITIONS

PROTECTIVE GEAR LEVEL

- MOPP Level 0
- MOPP Level 1
- MOPP Level 2



- MOPP Level 3
- MOPP Level 4
- Others(to be specified by user)

TARGET RANGE

(in meter increments defined by user)

TARGET CLASS

Area

Point

MOVEMENT STATUS OF GROUND TARGETS

Moving

Stationary

CONDITIONS RELATED TO FRIENDLY FORCES

ADDITIONAL CONDITIONS

ENVIRONMENTAL CONDITIONS

SPECIAL ENVIRONMENTS

Mountain

Jungle

Desert

Winter

Amphibious

WIND DIRECTION TYPE

Headwind

Tailwind

Cross wind

No wind

WIND VELOCITY

(in knots or in miles per hour in increments selected by user)

TEMPERATURE

(in degrees KELVIN, CELSIUS, or FAHRENHEIT in increments selected by user)

HEIGHT ABOVE SEA LEVEL

(in meters in increments selected by user)

PRECIPITATION

Clear

Snow

Ice

Rain

VISIBILITY (In meters)

ADDITIONAL CONDITIONS

None

THREAT/TARGET CONDITIONS

TARGET EXPOSURE TIME

(In seconds in increments specified by user)

GROUND TARGET SPEED

(In knots or in miles per hour in increments specified by user)

DIRECTED ENERGY WEAPON

Directed Energy Weapons Present

Directed Energy Weapons Absent

THREAT OBSTACLES

Minefield

Other (To be specified by user)

ASPECT OF GROUND TARGET

Frontal

Flanking

Oblique

NUMBER OF GROUND TARGETS

(To be specified by user)

TYPE OF THREAT TARGET ACQUISITION

Visual

Infrared radar/sensor

Sound/Flash radar

Others (to be specified by user)

CONDITIONS RELATED TO FRIENDLY FORCES

FIRE DISTRIBUTION TYPE

Point

Area

FIRE HEIGHT

Grazing

Plunging

TARGET DETECTION TECHNIQUE

Self-preservation

Overlapping strip method

FIRING POSITION

Foxhole

Prone unsupported

Prone supported

Alternate prone

Kneeling

MODE OF FIRE

Semi-automatic

Automatic

TYPE OF SIGHT

Naked Eye

AN/PVS 4 Night Vision Sight

Others (To be specified by user)

TABLE-6 CONDITIONS TAXONOMY FOR AUTOMATIC WEAPON

CONDITIONS TYPICALLY USED IN SETTING PERFORMANCE REQUIREMENTS

ENVIRONMENTAL CONDITIONS

DAY/NIGHT

- Day
- Night

VISIBILITY TYPE

- Clear
- Fog
- Haze
- Smoke
- Other (To be specified by user)

CLIMATE TYPE

- Hot/Dry
- Hot/Humid
- Basic/High Humid
- Basic/Hot
- Basic/Cold
- Cold
- Severe Cold

TERRAIN CONDITIONS

None

TARGET/THREAT-RELATED CONDITIONS

PROTECTIVE GEAR LEVEL

- MOPP Level 0
- MOPP Level 1
- MOPP Level 2
- MOPP Level 3

-MOPP Level 4

-Others(to be specified by user)

TARGET RANGE

(in meter increments defined by user)

TARGET CLASS

Area

Point

MOVEMENT STATUS OF GROUND TARGETS

Moving

Stationary

CONDITIONS RELATED TO FRIENDLY FORCES

ADDITIONAL CONDITIONS

ENVIRONMENTAL CONDITIONS

SPECIAL ENVIRONMENTS

Mountain

Jungle

Desert

Winter

Amphibious

WIND DIRECTION TYPE

Headwind

Tailwind

Cross wind

No wind

WIND VELOCITY

(in knots or in miles per hour in increments selected by user)

TEMPERATURE

(in degrees KELVIN, CELSIUS, or FAHRENHEIT in increments selected by user)

PRECIPITATION

Clear

Snow

Ice

Rain

VISIBILITY (In meters)

TERRAIN CONDITIONS

None

THREAT/TARGET CONDITIONS

TARGET EXPOSURE TIME

(In seconds in increments specified by user)

GROUND TARGET SPEED

(In knots or in miles per hour in increments specified by user)

DIRECTED ENERGY WEAPON

Directed Energy Weapons Present

Directed Energy Weapons Absent

THREAT OBSTACLES

Minefield

Other (To be specified by user)

ASPECT OF GROUND TARGET

Frontal

Flanking

Oblique

NUMBER OF GROUND TARGETS

(To be specified by user)

TYPE OF THREAT TARGET ACQUISITION

Visual

Infrared radar/sensor

Sound/Flash radar

Artillery locating radar

Air defense radar

Movement sensor

Pressure sensor

Radio direction finding system

Radar direction finding system

Others (to be specified by user)

#### CONDITIONS RELATED TO FRIENDLY FORCES

FIRE DISTRIBUTION TYPE

Point

Area

FIRE HEIGHT

Grazing

Plunging

FIRING POSITION

Foxhole

Prone unsupported

Prone supported

Alternate prone

Kneeling



TYPE OF SIGHT

Naked Eye

AN/PVS 5 Night Vision Goggles

Others (To be specified by user)

## CONDITIONS TAXONOMY FOR ANTITANK WEAPON

### CONDITIONS TYPICALLY USED IN SETTING PERFORMANCE REQUIREMENTS

#### ENVIRONMENTAL CONDITIONS

##### DAY/NIGHT

- Day
- Night

##### VISIBILITY TYPE

- Clear
- Fog
- Haze
- Smoke
- Other (To be specified by user)

##### CLIMATE TYPE

- Hot/Dry
- Hot/Humid
- Basic/High Humid
- Basic/Hot
- Basic/Cold
- Cold
- Severe Cold

#### TERRAIN CONDITIONS

None

#### TARGET/THREAT-RELATED CONDITIONS

##### PROTECTIVE GEAR LEVEL

- MOPP Level 0
- MOPP Level 1
- MOPP Level 2
- MOPP Level 3

-MOPP Level 4

-Others(to be specified by user)

TARGET RANGE

(in meter increments defined by user)

TARGET CLASS

Area

Point

MOVEMENT STATUS OF GROUND TARGETS

Moving

Stationary

CONDITIONS RELATED TO FRIENDLY FORCES

ADDITIONAL CONDITIONS

ENVIRONMENTAL CONDITIONS

SPECIAL ENVIRONMENTS

Mountain

Jungle

Desert

Winter

Amphibious

WIND DIRECTION TYPE

Headwind

Tailwind

Cross wind

No wind

WIND VELOCITY

(in knots or in miles per hour in increments selected by user)

TEMPERATURE

(in degrees KELVIN, CELSIUS, or FAHRENHEIT in increments selected by user)

PRECIPITATION

Clear

Snow

Ice

Rain

VISIBILITY (In meters)

TERRAIN CONDITIONS

None

THREAT/TARGET CONDITIONS

TARGET EXPOSURE TIME

(In seconds in increments specified by user)

GROUND TARGET SPEED

(In knots or in miles per hour in increments specified by user)

DIRECTED ENERGY WEAPON

Directed Energy Weapons Present

Directed Energy Weapons Absent

THREAT OBSTACLES

Minefield

Other (To be specified by user)

ASPECT OF GROUND TARGET

Frontal

Flanking  
Oblique

NUMBER OF GROUND TARGETS  
(To be specified by user)

TYPE OF THREAT TARGET ACQUISITION

Visual  
Infrared radar/sensor  
Sound/Flash radar  
Artillery locating radar  
Movement sensor  
Pressure sensor  
Radio direction finding system  
Others (to be specified by user)

CONDITIONS RELATED TO FRIENDLY FORCES

FIRING POSITION

Foxhole(Standing supported)  
Prone  
Kneeling  
Sitting  
Sitting supported

TYPE OF SIGHT

Naked Eye  
Night Tracker  
Others (To be specified by user)

TABLE C-8 CONDITIONS TAXONOMY FOR TANKS

CONDITIONS TYPICALLY USED IN SETTING PERFORMANCE REQUIREMENTS

ENVIRONMENTAL CONDITIONS

DAY/NIGHT

- Day
- Night

VISIBILITY TYPE

- Clear
- Fog
- Haze
- Smoke
- Other (To be specified by user)

CLIMATE TYPE

- Hot/Dry
- Hot/Humid
- Basic/High Humid
- Basic/Hot
- Basic/Cold
- Cold
- Severe Cold

ELECTROMAGNETIC HAZARDS

- With electromagnetic hazards
- Without electromagnetic hazards

TERRAIN CONDITIONS

ROAD TYPE

- Primary
- secondary

-cross country

#### NATURAL OBSTACLES

- Rivers and Streams
- Forests
- Mountains
- Lakes and Ponds
- Swamps, Marshes and Bogs
- Other (To be specified by user)

#### SIDE SLOPE OF OBSTACLE TO BE CROSSED

(In per cent or in degrees in increments defined by user)

#### GRADE SLOPE OF OBSTACLE TO BE CROSSED

(In per cent or in degrees in increments defined by user)

#### HORIZONTAL GAP OF DITCHES TO BE CROSSED

(in feet in increments defined by user)

#### SIZE OF VERTICAL WALLS TO BE CROSSED

(in feet in increments defined by user)

#### TARGET/THREAT-RELATED CONDITIONS

##### PROTECTIVE GEAR LEVEL

- MOPP Level 0
- MOPP Level 1
- MOPP Level 2
- MOPP Level 3
- MOPP Level 4
- Others(to be specified by user)

##### TARGET RANGE

(in meter increments defined by user)

ELECTROMAGNETIC PULSE (EMP)

- With EMP
- Without EMP

TYPE OF ELECTRONIC WARFARE PRESENT

- Beaconing
- Jamming
- Interference
- All of above
- None of above

CONDITIONS RELATED TO FRIENDLY FORCES

VEHICLE MOVEMENT STATUS

- Moving
- Stationary

ADDITIONAL CONDITIONS

ENVIRONMENTAL CONDITIONS

SPECIAL ENVIRONMENTS

- Mountain
- Jungle
- Desert
- Winter
- Amphibious

WIND DIRECTION TYPE

- Headwind
- Tailwind
- Cross wind
- No wind



WIND DIRECTION-MEASURED

(in mils from gun azimuth in increments selected by user)

WIND VELOCITY

(in knots or in miles per hour in increments selected by user)

PRESSURE

(in millibars in increments selected by user)

TEMPERATURE

(in degrees KELVIN, CELSIUS, or FAHRENHEIT in increments selected by user)

HEIGHT ABOVE SEA LEVEL

(in meters in increments selected by user)

PRECIPITATION

Clear

Snow

Ice

Rain

VISIBILITY (In meters)

TERRAIN CONDITIONS

ROAD SURFACE TYPE

-All weather road (concrete or bituminous concrete)

-Limited weather road (crushed rock, waterbound macadam, gravel)

-Fair Weather road (natural or stabilized soil, sand or clay, shell, cinder)

CROSS COUNTRY SURFACE TYPE

-Sand

- Bare packed ground
- Light vegetation
- Dense vegetation

LOAD BEARING CAPACITY OF GROUND/ROAD  
(In tons in increments specified by user)

GROUND SURFACE STATUS

Dry  
Wet  
Mud  
Ice  
Snow  
Dust

DEPTH OF WATER OBSTACLE  
(in feet in increments defined by user)

CURRENT OF RIVER TO BE FORDED  
(in knots or miles per hour in increments defined by the user)

TYPE OF RAIL, BRIDGE, OR TUNNEL  
(To be specified by user)

CURVATURE OF ROAD  
(Radius in meters in increments to be specified by user)

THREAT/TARGET CONDITIONS

GENERAL TARGET THREAT TYPES

Tank  
Armored personnel carrier  
Unarmored vehicle  
Helicopter

Fixed wing aircraft  
Artillery or air defense systems  
Troops  
Others (to be specified by user)

#### THREAT TANK AND ASSAULT GUN TYPES

T-62 Medium Tank  
T-64 Medium Tank  
T-55 Medium Tank  
T-72 Medium Tank  
SU-85 Assault gun  
PT-76 Light Amphibious Tank  
Others (to be specified by user)

#### THREAT ARMORED VEHICLES

BMP-1  
BTR 50-P  
BRDM-2  
BTR 60-P  
BMD  
Others (To be specified by user)

#### THREAT TROOP WEAPON TYPES

Assault rifle, AKMS  
Antitank grenade launcher, RPG-7  
7.62 light machine gun  
7.62 heavy machine gun  
82-mm mortar  
82-mm recoilless gun  
antitank gun SPG-9  
SAGGER antitank guided missile  
Others (To be specified by user)

#### THREAT HELICOPTER TYPES

Mi-8 HIP C Attack Helicopter  
Mi-8 HIP E Attack Helicopter

Mi-8 HIP F Attack Helicopter  
HIND A Attack Helicopter  
HIND B Attack Helicopter  
HIND C Attack Helicopter  
HIND D Attack Helicopter  
HIND E Attack Helicopter  
Mi-2 HOPLITE Transport Helicopter  
Mi-4 HOUND Transport Helicopter  
Mi-6 HOOK Transport Helicopter  
Others (Defined by User)

#### THREAT FIXED WING AIRCRAFT

Su-15 Fighter Interceptor  
Mig-25 FOXBAT Fighter Interceptor  
MIG-23 FLOGGER-B Tactical Fighter  
MIG-21 FISHBED Tactical Fighter  
Su-11 FISHPOT Fighter Interceptor  
Su-7 FITTER B Fighter Bomber  
Su-24 FENCER Fighter Bomber  
MIG-27 FLOGGER D Fighter Bomber  
Su-25 FROGFOOT Fighter Bomber  
Others (Defined by User)

#### TYPE OF THREAT ATTACK

Air Attack  
Indirect Fire Attack  
Sniper Fire Attack  
Tank/armored vehicle attack  
NBC Attack  
Attack with Light Antitank Weapon  
Others (To be specified by user)

#### TARGET AIRCRAFT COURSE

Crossing level  
Crossing diving  
Incoming diagonal

Outgoing  
Hovering

RANGE OF TARGET AIRCRAFT

(In meters in increments specified by user)

TARGET AIRCRAFT SPEED

(In knots or in miles per hour in increments specified by user )

NUMBER OF AIRBORNE TARGETS

(To be specified by user)

TARGET EXPOSURE TIME

(In seconds in increments specified by user)

GROUND TARGET SPEED

(In knots or in miles per hour in increments specified by user)

DIRECTED ENERGY WEAPON

Directed Energy Weapons Present

Directed Energy Weapons Absent

THREAT OBSTACLES

Minefield

Other (To be specified by user)

MOVEMENT STATUS OF GROUND TARGETS

Moving

Stationary

RANGE OF GROUND TARGETS

(in meters in increments selected by user)

ASPECT OF GROUND TARGET

Frontal

Flanking

Oblique

NUMBER OF GROUND TARGETS

(To be specified by user)

TYPE OF THREAT TARGET ACQUISITION

Visual

Infrared radar/sensor

Sound/Flash radar

Artillery locating radar

Movement sensor

Pressure sensor

Radio direction finding system

Others (to be specified by user)

CONDITIONS RELATED TO FRIENDLY FORCES

FIRE DISTRIBUTION TYPE

Point

Area

FIRE HEIGHT

Grazing

Plunging

MULTIPLE TARGET FIRE PATTERNS

Frontal

Crossfire

Depth

WEAPONS TYPE

.50 M2 HB machine gun

M240 COAX Machine gun

105mm main gun

M250 grenade launcher

Others (To be specified by user)

#### GUNNERY TECHNIQUE

Precision

Degraded Modes

Emergency

Manual

Battle sight gunnery

#### DEGRADED MODES OF EQUIPMENT OPERATION

Fire control system

Operational

Non-operational

Stabilization system

Operational

Non-operational

Laser Range Finder

Operational

Non-operational

Others (to be specified by user)

#### AMMUNITION TYPE

APDS-T, armor piercing discarding sabot-tracer

APDS, armor piercing discarding sabot

APFSDS, armor piercing fin stabilized discarding sabot

APFSDS-T, armor piercing discarding fin stabilized sabot-tracer

HE, high explosive

HEAT, high explosive antitank

HEAT-T, high explosive antitank-tracer

HEP-TP-T, high explosive plastic target practice-tracer

RP, red phosphorous

WP-T, white phosphorous- tracer

Others (to be specified by user)

#### AERIAL ENGAGEMENT METHOD

Active

Passive

CONDITION OF VEHICLE HATCHES

Buttoned-up

Open

COMMUNICATION MEDIUM

-Intercom

-Squad radio

-FM radio

-Wire

-Visual

-Voice

-Others (To be specified by user)

COMMUNICATION MODE

-Messages encoded and decoded

-Normal message traffic

TYPE OF SIGHT

Naked Eye

AN/PVS 5 Night Vision Goggles

AN/VVS 2 Night Vision Viewer

Others (To be specified by user)

TYPE OF HIGHER LEVEL UNIT OPERATION BEING SUPPORTED

Offensive

Movement To Contact

Hasty Attack

Deliberate Attack

Exploitation

Pursuit

Reconnaissance In Force

Raid

Feint

Demonstration

Defensive



Covering Force

Main Battle

Deep Attack

Rear Area Operations

Retrograde Operations

TYPE OF MOVEMENT WHEN NOT IN CONTACT WITH ENEMY

Traveling

Traveling Overwatch

Bounding Overwatch

FORMATION TYPE

Column

Line

Echelon

Vee

Wedge

Herring Bone

Coil

Laager

Others (To be specified by user)

TYPE OF OFFENSIVE OPERATION

Movement to contact

Assault

Mounted assault with tanks

Mounted assault without tanks

Dismounted assault

Passage of lines

Others (To be specified by user)

TYPE OF DEFENSIVE OPERATION

Disengagement

Aerial defense

Counterattack

Withdrawal

Delay  
Reserve  
Others (to be specified by user)

#### COMBAT PATROL MISSIONS

reconnaissance  
    route  
    zone  
    area  
ambush  
    point  
    area  
    antiarmor  
security/screen  
raid

#### SECURITY/SCREEN      OPERATIONS

Screen  
Guard  
Advance  
Flank  
Rear  
cover  
Others (to be specified by user)

TABLE C-9 CONDITIONS TAXONOMY FOR CALVARY FIGHTING VEHICLES

CONDITIONS TYPICALLY USED IN SETTING PERFORMANCE REQUIREMENTS

ENVIRONMENTAL CONDITIONS

DAY/NIGHT

- Day
- Night

VISIBILITY TYPE

- Clear
- Fog
- Haze
- Smoke
- Other (To be specified by user)

CLIMATE TYPE

- Hot/Dry
- Hot/Humid
- Basic/High Humid
- Basic/Hot
- Basic/Cold
- Cold
- Severe Cold

ELECTROMAGNETIC HAZARDS

- With electromagnetic hazards
- Without electromagnetic hazards

TERRAIN CONDITIONS

ROAD TYPE

- Primary
- secondary

-cross country

NATURAL OBSTACLE

- Rivers and Streams
- Forests
- Mountains
- Lakes and Ponds
- Swamps, Marshes and Bogs
- Other (To be specified by user)

SIDE SLOPE OF OBSTACLE TO BE CROSSED

(In per cent or in degrees in increments defined by user)

GRADE SLOPE OF OBSTACLE TO BE CROSSED

(In per cent or in degrees in increments defined by user)

HORIZONTAL GAP OF DITCHES TO BE CROSSED

(in feet in increments defined by user)

SIZE OF VERTICAL WALLS TO BE CROSSED

(in feet in increments defined by user)

TARGET/THREAT-RELATED CONDITIONS

PROTECTIVE GEAR LEVEL

- MOPP Level 0
- MOPP Level 1
- MOPP Level 2
- MOPP Level 3
- MOPP Level 4
- Others(to be specified by user)

TARGET RANGE

(in meter increments defined by user)

ELECTROMAGNETIC PULSE (EMP)

-With EMP

-Without EMP

TYPE OF ELECTRONIC WARFARE PRESENT

-Beaconing

-Jamming

-Interference

-All of above

-None of above

CONDITIONS RELATED TO FRIENDLY FORCES

VEHICLE MOVEMENT STATUS

Moving

Stationary

ADDITIONAL CONDITIONS

ENVIRONMENTAL CONDITIONS

SPECIAL ENVIRONMENTS

Mountain

Jungle

Desert

Winter

Amphibious

WIND DIRECTION TYPE

Headwind

Tailwind

Cross wind

No wind

WIND DIRECTION-MEASURED

(in mils from gun azimuth in increments selected by user)

WIND VELOCITY

(in knots or in miles per hour in increments selected by user)

PRESSURE

(in millibars in increments selected by user)

TEMPERATURE

(in degrees KELVIN, CELSIUS, or FAHRENHEIT in increments selected by user)

HEIGHT ABOVE SEA LEVEL

(in meters in increments selected by user)

PRECIPITATION

Clear

Snow

Ice

Rain

VISIBILITY (In meters)

TERRAIN CONDITIONS

ROAD SURFACE TYPE

-All weather road (concrete or bituminous concrete)

-Limited weather road (crushed rock, waterbound macadam, gravel)

-Fair Weather road (natural or stabilized soil, sand or clay, shell, cinder)

CROSS COUNTRY SURFACE TYPE

-Sand

-Bare packed ground

- Light vegetation
- Dense vegetation

LOAD BEARING CAPACITY OF GROUND/ROAD  
(In tons in increments specified by user)

GROUND SURFACE STATUS

Dry  
Wet  
Mud  
Ice  
Snow  
Dust

DEPTH OF WATER OBSTACLE  
(in feet in increments defined by user)

CURRENT OF RIVER TO BE FORDED  
(in knots or miles per hour in increments defined by the user)

TYPE OF RAIL, BRIDGE, OR TUNNEL  
(To be specified by user)

CURVATURE OF ROAD  
(Radius in meters in increments to be specified by user)

#### THREAT/TARGET CONDITIONS

GENERAL TARGET THREAT TYPES

Tank  
Armored personnel carrier  
Unarmored vehicle  
Helicopter  
Fixed wing aircraft

Artillery or air defense systems  
Troops  
Others (to be specified by user)

THREAT TANK AND ASSAULT GUN TYPES

T-62 Medium Tank  
T-64 Medium Tank  
T-55 Medium Tank  
T-72 Medium Tank  
SU-85 Assault gun  
PT-76 Light Amphibious Tank  
Others (to be specified by user)

THREAT ARMORED VEHICLES

BMP-1  
BTR 50-P  
BRDM-2  
BTR 60-P  
BMD  
Others (To be specified by user)

THREAT TROOP WEAPON TYPES

Assault rifle, AKMS  
Antitank grenade launcher, RPG-7  
7.62 light machine gun  
7.62 heavy machine gun  
82-mm mortar  
82-mm recoilless gun  
antitank gun SPG-9  
SAGGER antitank guided missile  
Others (To be specified by user)

THREAT HELICOPTER TYPES

Mi-8 HIP C Attack Helicopter  
Mi-8 HIP E Attack Helicopter  
Mi-8 HIP F Attack Helicopter



HIND A Attack Helicopter  
HIND B Attack Helicopter  
HIND C Attack Helicopter  
HIND D Attack Helicopter  
HIND E Attack Helicopter  
Mi-2 HOPLITE Transport Helicopter  
Mi-4 HOUND Transport Helicopter  
Mi-6 HOOK Transport Helicopter  
Others (Defined by User)

#### THREAT FIXED WING AIRCRAFT

Su-15 Fighter Interceptor  
Mig-25 FOXBAT Fighter Interceptor  
MIG-23 FLOGGER-B Tactical Fighter  
MIG-21 FISHBED Tactical Fighter  
Su-11 FISHPOT Fighter Interceptor  
Su-7 FITTER B Fighter Bomber  
Su-24 FENCER Fighter Bomber  
MIG-27 FLOGGER D Fighter Bomber  
Su-25 FROGFOOT Fighter Bomber  
Others (Defined by User)

#### TYPE OF THREAT ATTACK

Air Attack  
Indirect Fire Attack  
Sniper Fire Attack  
Tank/armored vehicle attack  
NBC Attack  
Attack with Light Antitank Weapon  
Others (To be specified by user)

#### TARGET AIRCRAFT COURSE

Crossing level  
Crossing diving  
Incoming diagonal  
Outgoing

Hovering

RANGE OF TARGET AIRCRAFT

(In meters in increments specified by user)

TARGET AIRCRAFT SPEED

(In knots or in miles per hour in increments specified by user )

NUMBER OF AIRBORNE TARGETS

(To be specified by user)

TARGET EXPOSURE TIME

(In seconds in increments specified by user)

GROUND TARGET SPEED

(In knots or in miles per hour in increments specified by user)

DIRECTED ENERGY WEAPON

Directed Energy Weapons Present

Directed Energy Weapons Absent

THREAT OBSTACLES

Minefield

Other (To be specified by user)

MOVEMENT STATUS OF GROUND TARGETS

Moving

Stationary

RANGE OF GROUND TARGETS

(in meters in increments selected by user)

ASPECT OF GROUND TARGET

Frontal

Flanking

Oblique

NUMBER OF GROUND TARGETS

(To be specified by user)

TYPE OF THREAT TARGET ACQUISITION

Visual

Infrared radar/sensor

Sound/Flash radar

Movement sensor

Pressure sensor

Radio direction finding system

Others (to be specified by user)

CONDITIONS RELATED TO FRIENDLY FORCES

FIRE DISTRIBUTION TYPE

Point

Area

TYPE OF GUNNERY

Precision

Battlesight

MULTIPLE TARGET FIRE PATTERNS

Frontal

Crossfire

Depth

WEAPON TYPES

M231 Firing Port Weapon

25mm automatic gun

M257 Smoke grenade launchers

TOW

M240 Machine gun

Others (To be specified by user)

**RATE OF FIRE**

Single Shot

Low Rate

High Rate

**TYPE OF SIGHT**

Integrated Sight Unit

Auxiliary Sight

Naked Eye

Ring Sight

AN/PVS 5 Night Vision Goggles

AN/VVS 2 Night Vision Viewer

Others (To be specified by user)

**AMMUNITION TYPE FOR AUTOMATIC GUN**

high explosive incendiary-tracer (HEI-T)

armor piercing discarding Sabot -tracer (APDS-T)

target practice-tracer

Others (To be specified by user)

**METHODS FOR DETERMINING TARGET RANGE**

Naked eye

Binocular

Stadia

Other (to be specified by user)

**TYPE OF POWER FOR FIRE CONTROL**

Vehicle

Battery

**SIGHT MODES**

Day

Night

**CONDITION OF VEHICLE HATCHES**

Buttoned-up

Open

COMMUNICATION MEDIUM

- Intercom
- Squad radio
- FM radio
- Wire
- Visual
- Voice
- Others (To be specified by user)

COMMUNICATION MODE

- Messages encoded and decoded
- Normal message traffic

TYPE OF HIGHER LEVEL UNIT OPERATION BEING SUPPORTED

Offensive

- Movement To Contact
- Hasty Attack
- Deliberate Attack
- Exploitation
- Pursuit
- Reconnaissance In Force
- Raid
- Feint
- Demonstration

Defensive

- Covering Force
- Main Battle
- Deep Attack
- Rear Area Operations
- Retrograde Operations

TYPE OF MOVEMENT WHEN NOT IN CONTACT WITH ENEMY

- Traveling
- Traveling Overwatch

Bounding Overwatch

FORMATION TYPE

Column

Line

Echelon

Vee

Wedge

Herring Bone

Coil

Laager

Others (To be specified by user)

TYPE OF OFFENSIVE OPERATION

Movement to contact

Assault

Mounted assault with tanks

Mounted assault without tanks

Dismounted assault

Passage of lines

Others (To be specified by user)

TYPE OF DEFENSIVE OPERATION

Disengagement

Aerial defense

Counterattack

Withdrawal

Delay

Reserve

Others (to be specified by user)

COMBAT PATROL MISSIONS

reconnaissance

route

zone

area

ambush

point

area

antiarmor

security/screen

raid

#### SECURITY/SCREEN OPERATIONS

Screen

Guard

Advance

Flank

Rear

cover

Others (to be specified by user)

TABLE C-10 CONDITIONS TAXONOMY FOR MEDIUM RANGE MISSILE  
ARTILLERY SYSTEMS (Self-propelled)

CONDITIONS TYPICALLY USED IN SETTING PERFORMANCE REQUIREMENTS

ENVIRONMENTAL CONDITIONS

DAY/NIGHT

- Day
- Night

VISIBILITY TYPE

- Clear
- Fog
- Haze
- Smoke
- Other (To be specified by user)

CLIMATE TYPE

- Hot/Dry
- Hot/Humid
- Basic/High Humid
- Basic/Hot
- Basic/Cold
- Cold
- Severe Cold

ELECTROMAGNETIC HAZARDS

- With electromagnetic hazards
- Without electromagnetic hazards

TERRAIN CONDITIONS

ROAD TYPE

- Primary



- secondary
- cross country

#### NATURAL OBSTACLES

- Rivers and Streams
- Forests
- Mountains
- Lakes and Ponds
- Swamps, Marshes and Bogs
- Other (To be specified by user)

#### LOAD BEARING CAPACITY OF GROUND/ROAD

(In tons in increments specified by user)

#### GROUND SURFACE STATUS

Dry  
Wet  
Mud  
Ice  
Snow  
Dust

#### SIDE SLOPE OF OBSTACLE TO BE CROSSED

(In percent or in degrees in increments defined by user)

#### GRADE SLOPE OF OBSTACLE TO BE CROSSED

(In percent or in degrees in increments defined by user)

#### HORIZONTAL GAP OF DITCHES TO BE CROSSED

(In feet in increments defined by user)

## TARGET/THREAT-RELATED CONDITIONS

### PROTECTIVE GEAR LEVEL

- MOPP Level 0
- MOPP Level 1
- MOPP Level 2
- MOPP Level 3
- MOPP Level 4
- Others(to be specified by user)

### TARGET RANGE

(in meter increments defined by user)

### ELECTROMAGNETIC PULSE (EMP)

- With EMP
- Without EMP

### TYPE OF ELECTRONIC WARFARE PRESENT

- Beaconing
- Jamming
- Interference
- All of above
- None of above

## CONDITIONS RELATED TO FRIENDLY FORCES

### FIRING INTENSITY

- Maximum
- Sustained

### MOVEMENT STATUS

- Emplaced
- Moving

ADDITIONAL CONDITIONS

ENVIRONMENTAL CONDITIONS

SPECIAL ENVIRONMENTS

Mountain  
Jungle  
Desert  
Winter  
Amphibious

WIND DIRECTION TYPE

Headwind  
Tailwind  
Cross wind  
No wind

WIND DIRECTION-MEASURED

(in mils from gun azimuth in increments selected by user)

WIND VELOCITY

(in knots or in miles per hour in increments selected by user)

PRESSURE

(in millibars in increments selected by user)

TEMPERATURE

(in degrees KELVIN, CELSIUS, or FAHRENHEIT in increments selected by user)

HEIGHT ABOVE SEA LEVEL

(in meters in increments selected by user)

PRECIPITATION

Clear

Snow

Ice

Rain

VISIBILITY (In meters)

TERRAIN CONDITIONS

ROAD SURFACE TYPE

- All weather road (concrete or bituminous concrete)
- Limited weather road (crushed rock, waterbound macadam, gravel)
- Fair Weather road (natural or stabilized soil, sand or clay, shell, cinder)

CROSS COUNTRY SURFACE TYPE

- Sand
- Bare packed ground
- Light vegetation
- Dense vegetation

SIZE OF VERTICAL WALLS TO BE CROSSED  
(in feet in increments defined by user)

DEPTH OF WATER OBSTACLE  
(in feet in increments defined by user)

CURRENT OF RIVER TO BE FORDED  
(in knots or miles per hour in increments defined by the user)

TYPE OF RAIL, BRIDGE, OR TUNNEL  
(To be specified by user)

CURVATURE OF ROAD

(Radius in meters in increments to be specified by user)

#### THREAT/TARGET CONDITIONS

##### NUCLEAR TARGET TYPES

###### Offensive

- Defensive Positions
- Fire support systems
- Command and Control Centers
- Reinforcement of defense
- Counter counterattacks
- Supply installations

###### Defensive

- Committed Frontline and Breakthrough forces
- Second Echelon lead elements
- Fire Support Systems
- Command and control centers
- Prestocked supplies

##### NON NUCLEAR TARGET TYPES

- Cannon and missile batteries
- Command and control elements
- Logistical elements
- Air defense sites
- Forward airfields
- Choke points

##### TYPE OF THREAT ATTACK

- Air Attack
- Indirect Fire Attack
- Sniper Fire Attack
- Tank/armored vehicle attack
- NBC Attack
- Attack with Light Antitank Weapon
- Others (To be specified by user)

TYPE OF THREAT TARGET ACQUISITION

Visual

Infrared radar/sensor

Sound/Flash radar

Artillery locating radar

Movement sensor

Pressure sensor

Others (to be specified by user)

CONDITIONS RELATED TO FRIENDLY FORCES

TYPE OF HIGHER LEVEL UNIT OPERATION BEING SUPPORTED

Offensive

Movement To Contact

Hasty Attack

Deliberate Attack

Exploitation

Pursuit

Reconnaissance In Force

Raid

Feint

Demonstration

Defensive

Covering Force

Main Battle

Deep Attack

Rear Area Operations

Retrograde Operations

COMMUNICATION MEDIUM

-FM Radio

-Wire

-Intercom

-Others (To be specified by user)

#### COMMUNICATION MODE

- Messages encoded and decoded
- Normal message traffic

#### TECHNIQUES OF MOVEMENT

- Traveling
- Traveling overwatch
- Bounding overwatch

#### METHOD FOR DETERMINING AZIMUTH

- PADS optical position and azimuth mark
- SIAGL
- Astronomic observation
- Simultaneous observation
- Direction traverse
- Others (to be specified by user)

#### METHODS FOR ESTABLISHING FIRING POINT

- Floating firing point
- Remote Theodite
- M2 Compass

#### WARHEAD TYPE

- Nuclear
- Non-nuclear
- Service Practice Round
- Training Warhead

#### FIRING POINT STATUS

- Surveyed in
- Not surveyed in

#### PLATFORM TYPE

- Self-propelled
- Towed

Air Transported

STATUS WHEN ATTACKED

Stationary

Moving

TYPE OF SIGHT

Naked Eye

Night With Night Vision Goggles

Others (To be specified by user)



TABLE C-11 CONDITIONS TAXONOMY FOR TOWED HOWITZERS

CONDITIONS TYPICALLY USED IN SETTING PERFORMANCE REQUIREMENTS

ENVIRONMENTAL CONDITIONS

DAY/NIGHT

- Day
- Night

VISIBILITY TYPE

- Clear
- Fog
- Haze
- Smoke
- Other (To be specified by user)

CLIMATE TYPE

- Hot/Dry
- Hot/Humid
- Basic/High Humid
- Basic/Hot
- Basic/Cold
- Cold
- Severe Cold

ELECTROMAGNETIC HAZARDS

- With electromagnetic hazards
- Without electromagnetic hazards

TERRAIN CONDITIONS

LOAD BEARING CAPACITY OF GROUND

(In tons in increments specified by user)

#### GROUND SURFACE STATUS

Dry  
Wet  
Mud  
Ice  
Snow  
Dust

#### SLIDE SLOPE OF TERRAIN

(In percent or in degrees in increments defined by user)

#### GRADE SLOPE OF TERRAIN

(In percent or in degrees in increments defined by user)

#### TARGET/THREAT-RELATED CONDITIONS

##### PROTECTIVE GEAR LEVEL

-MOPP Level 0  
-MOPP Level 1  
-MOPP Level 2  
-MOPP Level 3  
-MOPP Level 4  
-Others(to be specified by user)

##### TARGET RANGE

(in meter increments defined by user)

##### ELECTROMAGNETIC PULSE (EMP)

-With EMP  
-Without EMP

##### TYPE OF ELECTRONIC WARFARE PRESENT

-Beaconing  
-Jamming  
-Interference

- All of above
- None of above

#### CONDITIONS RELATED TO FRIENDLY FORCES

##### FIRING MODE

- Direct Fire
- Indirect Fire

##### PROPELLANT TYPE

- Rocket Assisted
- Normal

##### QUADRANT ELEVATIONS

(in mils in increments specified by user)

##### FIRING INTENSITY

- Maximum
- Sustained

##### MOVEMENT STATUS

- Emplaced
- Moving

##### DEGRADED MODES OF EQUIPMENT OPERATION

(to be specified by user)

#### ADDITIONAL CONDITIONS

#### ENVIRONMENTAL CONDITIONS

##### SPECIAL ENVIRONMENTS

Mountain  
Jungle  
Desert

Winter  
Amphibious

WIND DIRECTION TYPE

Headwind  
Tailwind  
Cross wind  
No wind

WIND DIRECTION-MEASURED

(in mils from gun azimuth in increments selected by user)

WIND VELOCITY

(in knots or in miles per hour in increments selected by user)

PRESSURE

(in millibars in increments selected by user)

TEMPERATURE

(in degrees KELVIN, CELSIUS, or FAHRENHEIT in increments selected by user)

HEIGHT ABOVE SEA LEVEL

(in meters in increments selected by user)

PRECIPITATION

Clear  
Snow  
Ice  
Rain

VISIBILITY (In meters)

TERRAIN CONDITIONS

None

## THREAT/TARGET CONDITIONS

### TARGET TYPE

C3 systems

fire support

maneuver

air defense artillery

engineer

reconnaissance, surveillance, and target acquisition

radio-electronic combat

nuclear/chemical

Class III -POL

Class 5-ammunition

Class 9-maintenance

lift (surface transport/helicopter)

lines of communication

Others (to be specified by user)

### TYPE OF THREAT TARGET ACQUISITION

Visual

Infrared radar/sensor

Sound/Flash radar

Artillery locating radar

Movement sensor

Pressure sensor

Others (to be specified by user)

## CONDITIONS RELATED TO FRIENDLY FORCES

### MECHANISMS FOR CONVERTING CALLS FOR FIRE INTO FIRING DATA

-Manual

-FADAC

-TACFIRE

-Higher Headquarters

-Others (to be specified by user)

#### TYPE OF HIGHER LEVEL UNIT OPERATION BEING SUPPORTED

##### Offensive

- Movement To Contact
- Hasty Attack
- Deliberate Attack
- Exploitation
- Pursuit
- Reconnaissance In Force
- Raid
- Feint
- Demonstration

##### Defensive

- Covering Force
- Main Battle
- Deep Attack
- Rear Area Operations
- Retrograde Operations

#### AMMUNITION TYPE

- HE-high explosive
- APICM-anti-personnel improved conventional mines
- FASCAM-family of scatterable mines
- COPPERHEAD
- HEP-high explosive plastic
- HEPT-high explosive plastic tracer
- HEAT-high explosive antitank
- SMOKE
- ILLUMINATION
- DPICIM-dual purpose improved conventional munitions
- WP-white phosphorous
- Others (To be specified by user)

#### TECHNIQUES OF MOVEMENT

Traveling

Traveling overwatch  
Bounding overwatch

TYPE OF SIGHT

Naked Eye  
Night With Night Vision Goggles  
Others (To be specified by user)

TABLE C-12 CONDITIONS TAXONOMY FOR SELF-PROPELLED HOWITZERS

CONDITIONS TYPICALLY USED IN SETTING PERFORMANCE REQUIREMENTS

ENVIRONMENTAL CONDITIONS

DAY/NIGHT

- Day
- Night

VISIBILITY TYPE

- Clear
- Fog
- Haze
- Smoke
- Other (To be specified by user)

CLIMATE TYPE

- Hot/Dry
- Hot/Humid
- Basic/High Humid
- Basic/Hot
- Basic/Cold
- Cold
- Severe Cold

ELECTROMAGNETIC HAZARDS

- With electromagnetic hazards
- Without electromagnetic hazards

TERRAIN CONDITIONS

ROAD TYPE

- Primary
- secondary



-cross country

#### NATURAL OBSTACLES

- Rivers and Streams
- Forests
- Mountains
- Lakes and Ponds
- Swamps, Marshes and Bogs
- Other (To be specified by user)

#### TARGET/THREAT-RELATED CONDITIONS

##### PROTECTIVE GEAR LEVEL

- MOPP Level 0
- MOPP Level 1
- MOPP Level 2
- MOPP Level 3
- MOPP Level 4
- Others(to be specified by user)

##### TARGET RANGE

(in meter increments defined by user)

##### ELECTROMAGNETIC PULSE (EMP)

- With EMP
- Without EMP

##### TYPE OF ELECTRONIC WARFARE PRESENT

- Beaconing
- Jamming
- Interference
- All of above
- None of above

#### CONDITIONS RELATED TO FRIENDLY FORCES

FIRING MODE

- Direct Fire
- Indirect Fire

PROPELLANT TYPE

- Rocket Assisted
- Normal

QUADRANT ELEVATIONS

(In mils in increments specified by user)

FIRING INTENSITY

- Maximum
- Sustained

MOVEMENT STATUS

- Emplaced
- Moving

DEGRADED MODES OF EQUIPMENT OPERATION

- Automated fire control system
  - Operational
  - Non-operational
- Automated navigation system
  - Operational
  - Non-operational
- Others (to be specified by user)

ADDITIONAL CONDITIONS

ENVIRONMENTAL CONDITIONS

SPECIAL ENVIRONMENTS

Mountain  
Jungle

Desert  
Winter  
Amphibious

WIND DIRECTION TYPE

Headwind  
Tailwind  
Cross wind  
No wind

WIND DIRECTION-MEASURED

(in mils from gun azimuth in increments selected by user)

WIND VELOCITY

(in knots or in miles per hour in increments selected by user)

PRESSURE

(in millibars in increments selected by user)

TEMPERATURE

(in degrees KELVIN, CELSIUS, or FAHRENHEIT in increments selected by user)

HEIGHT ABOVE SEA LEVEL

(in meters in increments selected by user)

PRECIPITATION

Clear  
Snow  
Ice  
Rain

VISIBILITY (In meters)

TERRAIN CONDITIONS

ROAD SURFACE TYPE

- All weather road (concrete or bituminous concrete)
- Limited weather road (crushed rock, waterbound macadam, gravel)
- Fair Weather road (natural or stabilized soil, sand or clay, shell, cinder)

CROSS COUNTRY SURFACE TYPE

- Sand
- Bare packed ground
- Light vegetation
- Dense vegetation

LOAD BEARING CAPACITY OF GROUND/ROAD

(In tons in increments specified by user)

GROUND SURFACE STATUS

Dry  
Wet  
Mud  
Ice  
Snow  
Dust

SIDE SLOPE OF OBSTACLE TO BE CROSSED

(In per cent or in degrees in increments defined by user)

GRADE SLOPE OF OBSTACLE TO BE CROSSED

(In per cent or in degrees in increments defined by user)

HORIZONTAL GAP OF DITCHES TO BE CROSSED

(in feet in increments defined by user)

SIZE OF VERTICAL WALLS TO BE CROSSED

(in feet in increments defined by user)

DEPTH OF WATER OBSTACLE

(in feet in increments defined by user)

CURRENT OF RIVER TO BE FORDED

(in knots or miles per hour in increments defined by the user)

TYPE OF RAIL, BRIDGE, OR TUNNEL

(To be specified by user)

CURVATURE OF ROAD

(Radius in meters in increments to be specified by user)

THREAT/TARGET CONDITIONS

TARGET TYPE

C3 systems

fire support

maneuver

air defense artillery

engineer

reconnaissance, surveillance, and target acquisition

radio-electronic combat

nuclear/chemical

Class III -POL

Class 5-ammunition

Class 9-maintenance

lift (surface transport/helicopter)

lines of communication

Others (to be specified by user)

TYPE OF THREAT ATTACK

Air Attack

Indirect Fire Attack

Sniper Fire Attack

Tank/armored vehicle attack

NBC Attack

Attack with Light Antitank Weapon  
Others (To be specified by user)

TYPE OF AIRBORNE THREAT  
Helicopter  
High Performance Aircraft

TARGET AIRCRAFT COURSE  
Crossing level  
Crossing diving  
Incoming diagonal  
Outgoing  
Hovering

RANGE OF TARGET AIRCRAFT  
(In meters in increments specified by user)

TARGET AIRCRAFT SPEED  
(In knots or in miles per hour in increments specified by user )

VEHICLE MOVEMENT STATUS WHEN FIRING CREW SERVED WEAPONS  
Moving  
Stationary

GROUND TARGET TYPE  
Troops  
Armored Vehicle  
Light skin vehicle  
Others (to be specified by user)

GROUND TARGET CLASS  
Point  
Area

GROUND TARGET SPEED

(In knots or in miles per hour in increments specified by user)

DIRECTED ENERGY WEAPON

Directed Energy Weapons Present

Directed Energy Weapons Absent

THREAT OBSTACLES

Minefield

Other (To be specified by user)

MOVEMENT STATUS OF GROUND TARGETS

Moving

Stationary

RANGE OF GROUND TARGETS

(in meters in increments selected by user)

ASPECT OF GROUND TARGET

Frontal

Flanking

Oblique

TYPE OF THREAT TARGET ACQUISITION

Visual

Infrared radar/sensor

Sound/Flash radar

Artillery locating radar

Movement sensor

Pressure sensor

Radio direction finding system

Others (to be specified by user)

CONDITIONS RELATED TO FRIENDLY FORCES

MECHANISMS FOR CONVERTING CALLS FOR FIRE INTO FIRING DATA

- Manual
- FADAC
- TACFIRE
- Higher Headquarters
- Others (to be specified by user)

#### TYPE OF HIGHER LEVEL UNIT OPERATION BEING SUPPORTED

##### Offensive

- Movement To Contact
- Hasty Attack
- Deliberate Attack
- Exploitation
- Pursuit
- Reconnaissance In Force
- Raid
- Feint
- Demonstration

##### Defensive

- Covering Force
- Main Battle
- Deep Attack
- Rear Area Operations
- Retrograde Operations

#### AMMUNITION TYPE

- HE-high explosive
- APICM-anti-personnel improved conventional mines
- FASCAM-family of scatterable mines
- COPPERHEAD
- HEP-high explosive plastic
- HEPT-high explosive plastic tracer
- HEAT-high explosive antitank
- SMOKE
- ILLUMINATION
- DPICIM-dual purpose improved conventional munitions
- WP-white phosphorous



-Others (To be specified by user)

#### COMMUNICATION MEDIUM

-FM Radio

-Wire

-Intercom

-Others (To be specified by user)

#### COMMUNICATION MODE

-Messages encoded and decoded

-Normal message traffic

#### TECHNIQUES OF MOVEMENT

Traveling

Traveling overwatch

Bounding overwatch

#### TYPE OF SIGHT

Naked Eye

Night Vision Goggles

Others (To be specified by user)

CONDITIONS TAXONOMY FOR ROCKET FIELD ARTILLERY SYSTEM

CONDITIONS TYPICALLY USED IN SETTING PERFORMANCE REQUIREMENTS

ENVIRONMENTAL CONDITIONS

DAY/NIGHT

- Day
- Night

VISIBILITY TYPE

- Clear
- Fog
- Haze
- Smoke
- Other (To be specified by user)

CLIMATE TYPE

- Hot/Dry
- Hot/Humid
- Basic/High Humid
- Basic/Hot
- Basic/Cold
- Cold
- Severe Cold

ELECTROMAGNETIC HAZARDS

- With electromagnetic hazards
- Without electromagnetic hazards

TERRAIN CONDITIONS

ROAD TYPE

- Primary
- secondary

-cross country

NATURAL OBSTACLES

- Rivers and Streams
- Forests
- Mountains
- Lakes and Ponds
- Swamps, Marshes and Bogs
- Other (To be specified by user)

TARGET/THREAT-RELATED CONDITIONS

PROTECTIVE GEAR LEVEL

- MOPP Level 0
- MOPP Level 1
- MOPP Level 2
- MOPP Level 3
- MOPP Level 4
- Others(to be specified by user)

TARGET RANGE

(in meter increments defined by user)

ELECTROMAGNETIC PULSE (EMP)

- With EMP
- Without EMP

TYPE OF ELECTRONIC WARFARE PRESENT

- Beaconing
- Jamming
- Interference
- All of above
- None of above

CONDITIONS RELATED TO FRIENDLY FORCES

FIRING INTENSITY

- Maximum
- Sustained

MOVEMENT STATUS

- Emplaced
- Moving

DEGRADED MODES OF EQUIPMENT OPERATION

- TBD

ADDITIONAL CONDITIONS

ENVIRONMENTAL CONDITIONS

SPECIAL ENVIRONMENTS

Mountain  
Jungle  
Desert  
Winter  
Amphibious

WIND DIRECTION TYPE

Headwind  
Tailwind  
Cross wind  
No wind

WIND DIRECTION-MEASURED

(in mils from gun azimuth in increments selected by user)

WIND VELOCITY

(in knots or in miles per hour in increments selected by user)

PRESSURE

(in millibars in increments selected by user)

TEMPERATURE

(in degrees KELVIN, CELSIUS, or FAHRENHEIT in increments selected by user)

HEIGHT ABOVE SEA LEVEL

(in meters in increments selected by user)

PRECIPITATION

Clear

Snow

Ice

Rain

VISIBILITY (In meters)

TERRAIN CONDITIONS

ROAD SURFACE TYPE

-All weather road (concrete or bituminous concrete)

-Limited weather road (crushed rock, waterbound macadam, gravel)

-Fair Weather road (natural or stabilized soil, sand or clay, shell, cinder)

CROSS COUNTRY SURFACE TYPE

-Sand

-Bare packed ground

-Light vegetation

-Dense vegetation

LOAD BEARING CAPACITY OF GROUND/ROAD

(In tons in increments specified by user)

GROUND SURFACE STATUS

Dry  
Wet  
Mud  
Ice  
Snow  
Dust

SIDE SLOPE OF OBSTACLE TO BE CROSSED

(In per cent or in degrees in increments defined by user)

GRADE SLOPE OF OBSTACLE TO BE CROSSED

(In per cent or in degrees in increments defined by user)

HORIZONTAL GAP OF DITCHES TO BE CROSSED

(in feet in increments defined by user)

SIZE OF VERTICAL WALLS TO BE CROSSED

(in feet in increments defined by user)

DEPTH OF WATER OBSTACLE

(in feet in increments defined by user)

CURRENT OF RIVER TO BE FORDED

(in knots or miles per hour in increments defined by the user)

TYPE OF RAIL, BRIDGE, OR TUNNEL

(To be specified by user)

CURVATURE OF ROAD

(Radius in meters in increments to be specified by user)

THREAT/TARGET CONDITIONS

TARGET TYPE

C3 systems

fire support  
maneuver  
air defense artillery  
engineer  
reconnaissance, surveillance, and target acquisition  
radio-electronic combat  
nuclear/chemical  
Class III -POL  
Class 5-ammunition  
Class 9-maintenance  
lift (surface transport/helicopter)  
lines of communication  
Others (to be specified by user)

#### TYPE OF THREAT ATTACK

Air Attack  
Indirect Fire Attack  
Sniper Fire Attack  
Tank/armored vehicle attack  
NBC Attack  
Attack with Light Antitank Weapon  
Others (To be specified by user)

#### TYPE OF THREAT TARGET ACQUISITION

Visual  
Infrared radar/sensor  
Sound/Flash radar  
Artillery locating radar  
Movement sensor  
Pressure sensor  
Radio direction finding system  
Others (to be specified by user)

#### CONDITIONS RELATED TO FRIENDLY FORCES

## MECHANISMS FOR CONVERTING CALLS FOR FIRE INTO FIRING DATA

- Manual
- FADAC
- TACFIRE
- Higher Headquarters
- Others (to be specified by user)

## TYPE OF HIGHER LEVEL UNIT OPERATION BEING SUPPORTED

### Offensive

- Movement To Contact
- Hasty Attack
- Deliberate Attack
- Exploitation
- Pursuit
- Reconnaissance In Force
- Raid
- Feint
- Demonstration

### Defensive

- Covering Force
- Main Battle
- Deep Attack
- Rear Area Operations
- Retrograde Operations

## AMMUNITION TYPE

- Dual Purpose Improved Conventional Munition
- Terminally Guided Warhead
- AT-2 scatterable minehead
- Sense and Destroy Armor Warhead
- Binary Chemical Warhead
- Others (To be specified by user)

## COMMUNICATION MEDIUM

- FM Radio
- Wire



- Intercom
- Others (To be specified by user)

#### COMMUNICATION MODE

- Messages encoded and decoded
- Normal message traffic

#### TECHNIQUES OF MOVEMENT

Traveling  
Traveling overwatch  
Bounding overwatch

#### FIRING INTENSITY

- Maximum
- Sustained

#### TYPE OF SIGHT

Naked Eye  
Night Vision Goggles  
Others (To be specified by user)

TABLE C-14 CONDITIONS TAXONOMY FOR MOBILE GUN SYSTEM

CONDITIONS TYPICALLY USED IN SETTING PERFORMANCE REQUIREMENTS

ENVIRONMENTAL CONDITIONS

DAY/NIGHT

- Day
- Night

VISIBILITY TYPE

- Clear
- Fog
- Haze
- Smoke
- Other (To be specified by user)

CLIMATE TYPE

- Hot/Dry
- Hot/Humid
- Basic/High Humid
- Basic/Hot
- Basic/Cold
- Cold
- Severe Cold

ELECTROMAGNETIC HAZARDS

- With electromagnetic hazards
- Without electromagnetic hazards

TERRAIN CONDITIONS

ROAD TYPE

- Primary
- secondary

-cross country

NATURAL OBSTACLES

- Rivers and Streams
- Forests
- Mountains
- Lakes and Ponds
- Swamps, Marshes and Bogs
- Other (To be specified by user)

TARGET/THREAT-RELATED CONDITIONS

PROTECTIVE GEAR LEVEL

- MOPP Level 0
- MOPP Level 1
- MOPP Level 2
- MOPP Level 3
- MOPP Level 4
- Others(to be specified by user)

TARGET RANGE

(in meter increments defined by user)

TARGET TYPE

Aircraft  
Ground

ELECTROMAGNETIC PULSE (EMP)

- With EMP
- Without EMP

TYPE OF ELECTRONIC WARFARE PRESENT

- Beaconing
- Jamming
- Interference

- All of above
- None of above

#### CONDITIONS RELATED TO FRIENDLY FORCES

##### FIRING INTENSITY

- Maximum/Low Fire
- Sustained/High Fire

##### MOVEMENT STATUS

- Emplaced
- Moving

#### ADDITIONAL CONDITIONS

##### ENVIRONMENTAL CONDITIONS

##### SPECIAL ENVIRONMENTS

Mountain  
Jungle  
Desert  
Winter  
Amphibious

##### WIND DIRECTION TYPE

Headwind  
Tailwind  
Cross wind  
No wind

##### WIND DIRECTION-MEASURED

(in mils from gun azimuth in increments selected by user)

##### WIND VELOCITY

(in knots or in miles per hour in increments selected by user)

PRESSURE

(in millibars in increments selected by user)

TEMPERATURE

(in degrees KELVIN, CELSIUS, or FAHRENHEIT in increments selected by user)

HEIGHT ABOVE SEA LEVEL

(in meters in increments selected by user)

PRECIPITATION

Clear

Snow

Ice

Rain

VISIBILITY (In meters)

TERRAIN CONDITIONS

ROAD SURFACE TYPE

-All weather road (concrete or bituminous concrete)

-Limited weather road (crushed rock, waterbound macadam, gravel)

-Fair Weather road (natural or stabilized soil, sand or clay, shell, cinder)

CROSS COUNTRY SURFACE TYPE

-Sand

-Bare packed ground

-Light vegetation

-Dense vegetation

LOAD BEARING CAPACITY OF GROUND/ROAD

(In tons in increments specified by user)

GROUND SURFACE STATUS

Dry  
Wet  
Mud  
Ice  
Snow  
Dust

SIDE SLOPE OF OBSTACLE TO BE CROSSED

(In per cent or in degrees in increments defined by user)

GRADE SLOPE OF OBSTACLE TO BE CROSSED

(In per cent or in degrees in increments defined by user)

HORIZONTAL GAP OF DITCHES TO BE CROSSED

(in feet in increments defined by user)

SIZE OF VERTICAL WALLS TO BE CROSSED

(in feet in increments defined by user)

DEPTH OF WATER OBSTACLE

(in feet in increments defined by user)

CURRENT OF RIVER TO BE FORDED

(in knots or miles per hour in increments defined by the user)

TYPE OF RAIL, BRIDGE, OR TUNNEL

(To be specified by user)

CURVATURE OF ROAD

(Radius in meters in increments to be specified by user)

THREAT/TARGET CONDITIONS

TYPE OF THREAT ATTACK

Air Attack  
Indirect Fire Attack  
Sniper Fire Attack  
Tank/armored vehicle attack  
NBC Attack  
Attack with Light Antitank Weapon  
Others (To be specified by user)

#### TYPE OF AIRBORNE THREAT

Helicopter  
High Performance Aircraft

#### THREAT HELICOPTER TYPES

Mi-8 HIP C Attack Helicopter  
Mi-8 HIP E Attack Helicopter  
Mi-8 HIP F Attack Helicopter  
HIND A Attack Helicopter  
HIND B Attack Helicopter  
HIND C Attack Helicopter  
HIND D Attack Helicopter  
HIND E Attack Helicopter  
Mi-2 HOPLITE Transport Helicopter  
Mi-4 HOUND Transport Helicopter  
Mi-6 HOOK Transport Helicopter  
Others (Defined by User)

#### THREAT FIXED WING AIRCRAFT TYPES

Su-15 Fighter Interceptor  
Mig-25 FOXBAT Fighter Interceptor  
MIG-23 FLOGGER-B Tactical Fighter  
MIG-21 FISHBED Tactical Fighter  
Su-11 FISHPOT Fighter Interceptor  
Su-7 FITTER B Fighter Bomber  
Su-24 FENCER Fighter Bomber  
MIG-27 FLOGGER D Fighter Bomber  
Su-25 FROGFOOT Fighter Bomber

Others (Defined by User)

TARGET AIRCRAFT COURSE

Crossing level

Crossing diving

Incoming diagonal

Outgoing

Hovering

RANGE OF TARGET AIRCRAFT

(In meters in increments specified by user)

TARGET AIRCRAFT SPEED

(In knots or in miles per hour in increments specified by user )

SIZE OF THREAT AIRCRAFT

(In meters in increments specified by user)

TARGET EXPOSURE TIME

(In seconds in increments specified by user)

ALTITUDE OF TARGET

(In feet, increments defined by user)

GROUND TARGET TYPE

Troops

Armored Vehicle

Light skin vehicle

Others (to be specified by user)

GROUND TARGET CLASS

Point

Area

GROUND TARGET SPEED

(In knots or in miles per hour in increments specified by user)



DIRECTED ENERGY WEAPON

Directed Energy Weapons Present

Directed Energy Weapons Absent

THREAT OBSTACLES

Minefield

Other (To be specified by user)

MOVEMENT STATUS OF GROUND TARGETS

Moving

Stationary

RANGE OF GROUND TARGETS

(in meters in increments selected by user)

ASPECT OF GROUND TARGET

Frontal

Flanking

Oblique

TYPE OF THREAT TARGET ACQUISITION

Visual

Infrared radar/sensor

Sound/Flash radar

Artillery locating radar

Movement sensor

Pressure sensor

Radio direction finding system

Others (to be specified by user)

CONDITIONS RELATED TO FRIENDLY FORCES

BORESIGHT METHOD

Distant Aiming Point

## Target

### WEAPON TYPE

20mm

Others (To be specified by user)

### AMMUNITION TYPE

HEIT-SD, High Explosive Incendiary With Tracer Self-Destroying

HEI, High Explosive Incendiary

TP-T-Target Practice Tracer

TP-Target Practice

Dummy

Others (To be specified by user)

### AIR DEFENSE WARNING STATUS

Red-Attack in progress or imminent

Yellow-Attack probable

White-Attack not probable

### WEAPONS CONTROL STATUS

Weapons free

Weapons tight

Weapons hold

### TYPE OF GROUND SUPPORT

Direct fire-perimeter defense

Ground direct fire

Indirect fire

### TYPES OF AIR DEFENSE

March Column

Maneuver Force

Critical Asset/Combat Support Element

Company Size Maneuver Force

### VEHICLE MOVEMENT

Moving  
Stationary

FIRING RATE

Low fire  
High fire

TYPE OF DEFENSE

Static Point  
Mobile Point

SPECIAL OPERATIONS

Airborne Operations  
Air Assault Operations  
Defense of Railroad train

TYPE OF SIGHT

Naked Eye  
Night Vision Goggles  
Others (To be specified by user)

TYPE OF HIGHER LEVEL UNIT OPERATION BEING SUPPORTED

Offensive

Movement To Contact  
Hasty Attack  
Deliberate Attack  
Exploitation  
Pursuit  
Reconnaissance In Force  
Raid  
Feint  
Demonstration

Defensive

Covering Force  
Main Battle  
Deep Attack

Rear Area Operations  
Retrograde Operations

COMMUNICATION MEDIUM

- FM Radio
- Wire
- Intercom
- Others (To be specified by user)

COMMUNICATION MODE

- Messages encoded and decoded
- Normal message traffic

TECHNIQUES OF MOVEMENT

Traveling  
Traveling overwatch  
Bounding overwatch

TABLE C-15 CONDITIONS TAXONOMY FOR MAN-PORTABLE AIR DEFENSE  
SYSTEM

CONDITIONS TYPICALLY USED IN SETTING PERFORMANCE REQUIREMENTS

ENVIRONMENTAL CONDITIONS

DAY/NIGHT

- Day
- Night

VISIBILITY TYPE

- Clear
- Fog
- Haze
- Smoke
- Other (To be specified by user)

CLIMATE TYPE

- Hot/Dry
- Hot/Humid
- Basic/High Humid
- Basic/Hot
- Basic/Cold
- Cold
- Severe Cold

TERRAIN CONDITIONS

None

TARGET/THREAT-RELATED CONDITIONS

PROTECTIVE GEAR LEVEL

- MOPP Level 0

- MOPP Level 1
- MOPP Level 2
- MOPP Level 3
- MOPP Level 4
- Others(to be specified by user)

#### TARGET RANGE

(in meter increments defined by user)

#### TARGET TYPE

Aircraft

Ground

#### CONDITIONS RELATED TO FRIENDLY FORCES

#### INITIAL ENGAGEMENT POSITION

Mounted

Foot-march

Foxhole

#### ADDITIONAL CONDITIONS

#### ENVIRONMENTAL CONDITIONS

#### ELECTROMAGNETIC HAZARDS

- With electromagnetic hazards
- Without electromagnetic hazards

#### SPECIAL ENVIRONMENTS

Mountain

Jungle

Desert

Winter

Amphibious

WIND DIRECTION TYPE

Headwind

Tailwind

Cross wind

No wind

WIND DIRECTION-MEASURED

(in mils from gun azimuth in increments selected by user)

WIND VELOCITY

(in knots or in miles per hour in increments selected by user)

PRESSURE

(in millibars in increments selected by user)

TEMPERATURE

(in degrees KELVIN, CELSIUS, or FAHRENHEIT in increments selected by user)

HEIGHT ABOVE SEA LEVEL

(in meters in increments selected by user)

PRECIPITATION

Clear

Snow

Ice

Rain

VISIBILITY (In meters)

TERRAIN CONDITIONS

None

## THREAT/TARGET CONDITIONS

### ELECTROMAGNETIC PULSE (EMP)

- With EMP
- Without EMP

### TYPE OF ELECTRONIC WARFARE PRESENT

- Beaconing
- Jamming
- Interference
- All of above
- None of above

### TYPE OF THREAT ATTACK

Air Attack  
Indirect Fire Attack  
Sniper Fire Attack  
Tank/armored vehicle attack  
NBC Attack  
Attack with Light Antitank Weapon  
Others (To be specified by user)

### TYPE OF AIRBORNE THREAT

Helicopter  
High Performance Aircraft

### THREAT HELICOPTER TYPES

Mi-8 HIP C Attack Helicopter  
Mi-8 HIP E Attack Helicopter  
Mi-8 HIP F Attack Helicopter  
HIND A Attack Helicopter  
HIND B Attack Helicopter  
HIND C Attack Helicopter  
HIND D Attack Helicopter  
HIND E Attack Helicopter  
Mi-2 HOPLITE Transport Helicopter



Mi-4 HOUND Transport Helicopter  
Mi-6 HOOK Transport Helicopter  
Others (Defined by User)

THREAT FIXED WING AIRCRAFT TYPES

Su-15 Fighter Interceptor  
Mig-25 FOXBAT Fighter Interceptor  
MIG-23 FLOGGER-B Tactical Fighter  
MIG-21 FISHBED Tactical Fighter  
Su-11 FISHPOT Fighter Interceptor  
Su-7 FITTER B Fighter Bomber  
Su-24 FENCER Fighter Bomber  
MIG-27 FLOGGER D Fighter Bomber  
Su-25 FROGFOOT Fighter Bomber  
Others (Defined by User)

TARGET AIRCRAFT COURSE

Crossing level  
Crossing diving  
Incoming diagonal  
Outgoing  
Hovering

RANGE OF TARGET AIRCRAFT

(In meters in increments specified by user)

TARGET AIRCRAFT SPEED

(In knots or in miles per hour in increments specified by user )

SIZE OF THREAT AIRCRAFT

(In meters in increments specified by user)

TARGET EXPOSURE TIME

(In seconds in increments specified by user)

ALTITUDE OF TARGET

(In feet, increments defined by user)

TYPE OF THREAT TARGET ACQUISITION

Visual

Infrared radar/sensor

Sound/Flash radar

Others (to be specified by user)

CONDITIONS RELATED TO FRIENDLY FORCES

AMMUNITION TYPE

HEIT-SD, High Explosive Incendiary With Tracer Self-Destroying

HEI, High Explosive Incendiary

TP-T-Target Practice Tracer

TP-Target Practice

Dummy

Others (To be specified by user)

AIR DEFENSE WARNING STATUS

Red-Attack in progress or imminent

Yellow-Attack probable

White-Attack not probable

WEAPONS CONTROL STATUS

Weapons free

Weapons tight

Weapons hold

TYPE OF GROUND SUPPORT

direct fire-perimeter defense

ground direct fire

indirect fire

TYPES OF AIR DEFENSE

March Column  
Maneuver Force  
Critical Asset/Combat Support Element  
Company Size Maneuver Force

FIRING RATE

Low fire  
High fire

TYPE OF DEFENSE

Static Point  
Mobile Point

SPECIAL OPERATIONS

Airborne Operations  
Air Assault Operations  
Defense of Railroad train

TYPE OF SIGHT

Naked Eye  
Night Vision Goggles  
Others (To be specified by user)

TABLE C-16 CONDITIONS TAXONOMY FOR ATTACK HELICOPTER

CONDITIONS TYPICALLY USED IN SETTING PERFORMANCE REQUIREMENTS

ENVIRONMENTAL CONDITIONS

DAY/NIGHT

- Day
- Night

VISIBILITY TYPE

- Clear
- Fog
- Haze
- Smoke
- Other (To be specified by user)

FLIGHT RULES/CONDITION

- Instrument Flight Rules/Instrument Flight Conditions
- Visual Flight Rules/Visual Flight Conditions

CLIMATE TYPE

- Hot/Dry
- Hot/Humid
- Basic/High Humid
- Basic/Hot
- Basic/Cold
- Cold
- Severe Cold

ALTITUDE

(in feet above ground level in increments selected by the user)

ELECTROMAGNETIC HAZARDS

- With electromagnetic hazards
- Without electromagnetic hazards

## TERRAIN CONDITIONS

### TYPE OF LANDING AREA

Confined Area

Slopes

Pinnacle or Ridge

Water

Normal runway

Others (to be specified by user)

## TARGET/THREAT-RELATED CONDITIONS

### PROTECTIVE GEAR LEVEL

-MOPP Level 0

-MOPP Level 1

-MOPP Level 2

-MOPP Level 3

-MOPP Level 4

-Others(to be specified by user)

### TARGET RANGE

(in meter increments defined by user)

### ELECTROMAGNETIC PULSE (EMP)

-With EMP

-Without EMP

### TYPE OF ELECTRONIC WARFARE

Signal Intercept

Direction Finding

Jamming

Beaconing(Deception )

All of the above

None of the above

GENERAL TARGET TYPE

Armored Vehicle

Light skinned/unarmored vehicle

Troops

Airborne Threat

Fixed threat emplacement

Others (to be specified by user)

CONDITIONS RELATED TO FRIENDLY FORCES

MODES OF FLIGHT

Regular

Terrain

-Low Level

-Contour

-Nap of the Earth

NAVIGATION TECHNIQUE

Radio

FM Homing

Dead Reckoning

Pilotage

Doppler

OMEGA/GPS

Others (to be specified by user)

ADDITIONAL CONDITIONS

ENVIRONMENTAL CONDITIONS

SPECIAL ENVIRONMENTS

Mountain

Jungle

Desert  
Winter  
Amphibious

WIND DIRECTION TYPE

Headwind  
Tailwind  
Cross wind  
No wind

WIND DIRECTION-MEASURED

(in degrees from aircraft azimuth in increments selected by user)

WIND VELOCITY

(in knots or in miles per hour in increments selected by user)

PRESSURE

(in millibars in increments selected by user)

TEMPERATURE

(in degrees KELVIN, CELSIUS, or FAHRENHEIT in increments selected by user)

PRECIPITATION

Clear  
Snow  
Ice  
Rain

VISIBILITY (In meters)

TERRAIN CONDITIONS

LOAD BEARING CAPACITY OF GROUND

(In tons in increments specified by user)

GROUND SURFACE STATUS

Dry  
Wet  
Mud  
Ice  
Snow  
Dust

SIDE SLOPE OF TERRAIN

(In per cent or in degrees in increments defined by user)

GRADE SLOPE OF TERRAIN

(In per cent or in degrees in increments defined by user)

THREAT/TARGET CONDITIONS

TYPES OF THREAT

Small arms  
tank  
large caliber antiaircraft fire  
high performance aircraft  
helicopter  
Heat Seeking Missile  
Antitank Guided Missile and Rocket Propelled Grenades  
Air defense missiles

NUMBER OF TARGETS

Single  
multiple

TARGET EXPOSURE TIME

(In seconds in increments specified by user)

GROUND TARGET CLASS

Point  
Area



GROUND TARGET SPEED

(In knots or in miles per hour in increments specified by user)

DIRECTED ENERGY WEAPON

Directed Energy Weapons Present

Directed Energy Weapons Absent

THREAT OBSTACLES

Minefield

Other (To be specified by user)

MOVEMENT STATUS OF GROUND TARGETS

Moving

Stationary

RANGE OF GROUND TARGETS

(in meters in increments selected by user)

ASPECT OF GROUND TARGET

Frontal

Flanking

Oblique

TYPE OF THREAT TARGET ACQUISITION

Visual

Infrared radar/sensor

Air defense radar

Radio direction finding system

Radar direction finding system

Others (to be specified by user)

CONDITIONS RELATED TO FRIENDLY FORCES

TYPE OF SIGHT

Night Vision Goggles

Night Hawk

Naked Eye

Binoculars

Target Acquisition and Designation Sight

Others (to be specified by user)

WEAPON TYPE

Air to Air Stinger

30-mm cannon

2.75 inch FFAR/Hydra

HELLFIRE

Others (to be specified by user)

FLIGHT MODE

Hover

Moving

WEAPON MODE

TSU

HSS

Direct Laser

Direct

Indirect

Stadiametric

Indirect Stadiametric

Direct Stadiametric

Reflex Sight

Reflex Direct

Reflex Indirect

Flex

Fixed

Others (to be specified by user)

AFT PILOT STATUS

With AFT Pilot

Without AFT Pilot

DEGRADED MODES OF OPERATION

Engine

One engine operational

Both engines operational

Hydraulic System

Operational

Non- operational

Stability Augmentation System/automatic Flight Control

Operational

Non-operational

AFSC Servo

Operational

Non-operational

Two way radio

Operational

Non-operational

Electrical Control Unit lockout

Operational

Non-operational

Stabilator

Operational

Non-operational

Night Vision Sensor

Operational

Non-operational

TYPE OF NAVIGATIONAL AID

VOR

LOC

ASR

NDB

Others (to be specified by user)

TAKEOFF GROSS WEIGHT

(in lbs. in increments specified by user

MAXIMUM WEIGHT OF LOAD

(in lbs in increments specified by user )

TYPE OF ECCM

Jamming

Chaff

Flares

Others (to be specified by user)

COMMUNICATION MEDIUM

-Two way radio

-Intercom

-Others (To be specified by user)

COMMUNICATION MODE

-Messages encoded and decoded

-Normal message traffic

TYPE OF HIGHER LEVEL UNIT OPERATION BEING SUPPORTED

Offensive

Movement To Contact

Hasty Attack

Deliberate Attack

Exploitation

Pursuit

Reconnaissance In Force

Raid

Feint

Demonstration

Defensive

Covering Force

Main Battle

Deep Attack

Rear Area Operations

## **Retrograde Operations**

### **TYPE OF RECONNAISSANCE**

Route

River

Area

Zone

### **TYPES OF SECURITY OPERATIONS**

Screen

Guard

Cover

Area

### **TECHNIQUES OF MOVEMENT**

Traveling

Traveling overwatch

Bounding overwatch

### **SPECIAL OPERATIONS**

command and control

courier/messenger

aerial radio relay

aerial column control/traffic survey

aerial radiological survey

aerial artillery observation and adjustment

amphibious/sea

search and rescue

Others (to be specified by user)

TABLE C-17 CONDITIONS TAXONOMY FOR CARGO HELICOPTER

CONDITIONS TYPICALLY USED IN SETTING PERFORMANCE REQUIREMENTS

ENVIRONMENTAL CONDITIONS

DAY/NIGHT

- Day
- Night

VISIBILITY TYPE

- Clear
- Fog
- Haze
- Smoke
- Other (To be specified by user)

FLIGHT RULES/CONDITION

- Instrument Flight Rules/Instrument Flight Conditions
- Visual Flight Rules/Visual Flight Conditions

CLIMATE TYPE

- Hot/Dry
- Hot/Humid
- Basic/High Humid
- Basic/Hot
- Basic/Cold
- Cold
- Severe Cold

ALTITUDE

(in feet above ground level in increments selected by the user)

ELECTROMAGNETIC HAZARDS

- With electromagnetic hazards
- Without electromagnetic hazards

## TERRAIN CONDITIONS

### TYPE OF LANDING AREA

Confined Area

Slopes

Pinnacle or Ridge

Water

Normal runway

Others (to be specified by user)

## TARGET/THREAT-RELATED CONDITIONS

### PROTECTIVE GEAR LEVEL

-MOPP Level 0

-MOPP Level 1

-MOPP Level 2

-MOPP Level 3

-MOPP Level 4

-Others(to be specified by user)

### TARGET RANGE

(in meter increments defined by user)

### ELECTROMAGNETIC PULSE (EMP)

-With EMP

-Without EMP

### TYPE OF ELECTRONIC WARFARE

Signal Intercept

Direction Finding

Jamming

Baconing (Deception)

All of the above

None of the above

GENERAL TARGET TYPE

Armored Vehicle

Light skinned/unarmored vehicle

Troops

Airborne Threat

Fixed threat emplacement

Others (to be specified by user)

CONDITIONS RELATED TO FRIENDLY FORCES

MODES OF FLIGHT

Regular

Terrain

-Low Level

-Contour

-Nap of the Earth

NAVIGATION TECHNIQUE

Radio

FM Homing

Dead Reckoning

Pilotage

Doppler

OMEGA/GPS

Others (to be specified by user)

LOAD TYPE

External

Internal

ADDITIONAL CONDITIONS

ENVIRONMENTAL CONDITIONS



## SPECIAL ENVIRONMENTS

Mountain  
Jungle  
Desert  
Winter  
Amphibious

## WIND DIRECTION TYPE

Headwind  
Tailwind  
Cross wind  
No wind

## WIND DIRECTION-MEASURED

(in degrees from aircraft azimuth in increments selected by user)

## WIND VELOCITY

(in knots or in miles per hour in increments selected by user)

## PRESSURE

(in millibars in increments selected by user)

## TEMPERATURE

(in degrees KELVIN, CELSIUS, or FAHRENHEIT in increments selected by user)

## PRECIPITATION

Clear  
Snow  
Ice  
Rain

## VISIBILITY (In meters)

## TERRAIN CONDITIONS

LOAD BEARING CAPACITY OF GROUND

(In tons in increments specified by user)

GROUND SURFACE STATUS

Dry

Wet

Mud

Ice

Snow

Dust

SIDE SLOPE OF TERRAIN

(In per cent or in degrees in increments defined by user)

GRADE SLOPE OF TERRAIN

(In per cent or in degrees in increments defined by user)

THREAT/TARGET CONDITIONS

NUMBER OF TARGETS

Single

Multiple

TARGET EXPOSURE TIME

(In seconds in increments specified by user)

GROUND TARGET CLASS

Point

Area

GROUND TARGET SPEED

(In knots or in miles per hour in increments specified by user)

DIRECTED ENERGY WEAPON

Directed Energy Weapons Present

Directed Energy Weapons Absent

THREAT OBSTACLES

Minefield

Other (To be specified by user)

MOVEMENT STATUS OF GROUND TARGETS

Moving

Stationary

RANGE OF GROUND TARGETS

(in meters in increments selected by user)

ASPECT OF GROUND TARGET

Frontal

Flanking

Oblique

TYPE OF THREAT TARGET ACQUISITION

Visual

Infrared radar/sensor

Air defense radar

Radio direction finding system

Radar direction finding system

Others (to be specified by user)

CONDITIONS RELATED TO FRIENDLY FORCES

TYPE OF SIGHT

Night Vision Goggles

Night Hawk

Naked Eye

Binoculars

Target Acquisition and Designation Sight  
Others (to be specified by user)

WEAPON TYPE

7.62 mm machine gun  
Others (to be specified by user)

FLIGHT MODE

Hover  
Moving

DEGRADED MODES OF OPERATION

Engine

One engine operational  
Both engines operational

Hydraulic System

Operational  
Non- operational

Stability Augmentation System/automatic Flight Control

Operational  
Non-operational

AFSC Servo

Operational  
Non-operational

Two way radio

Operational  
Non-operational

Electrical Control Unit lockout

Operational  
Non-operational

Stabilator

Operational  
Non-operational

Night Vision Sensor

Operational  
Non-operational

TYPE OF NAVIGATIONAL AID

VOR

LOC

ASR

NDB

Others (to be specified by user)

TAKEOFF GROSS WEIGHT

(in lbs. in increments specified by user

MAXIMUM WEIGHT OF LOAD

(in lbs in increments specified by user )

TYPE OF ECCM

Jamming

Chaff

Flares

Others (to be specified by user)

COMMUNICATION MEDIUM

-Two way radio

-Intercom

-Others (To be specified by user)

COMMUNICATION MODE

-Messages encoded and decoded

-Normal message traffic

TYPE OF HIGHER LEVEL UNIT OPERATION BEING SUPPORTED

Offensive

Movement To Contact

Hasty Attack

Deliberate Attack

Exploitation

Pursuit

Reconnaissance In Force

Raid

Feint

Demonstration

Defensive

Covering Force

Main Battle

Deep Attack

Rear Area Operations

Retrograde Operations

#### TECHNIQUES OF MOVEMENT

Traveling

Traveling overwatch

Bounding overwatch

#### SPECIAL OPERATIONS

command and control

courier/messenger

aerial radio relay

emergency aerial resupply

aerial column control/traffic survey

aerial radiological survey

aerial artillery observation and adjustment

amphibious/sea

parachuting

repelling

search and rescue

paradrop

internal hoist

aerial mine delivery

Others (to be specified by user)

TABLE C-18 CONDITIONS TAXONOMY FOR UTILITY HELICOPTER

CONDITIONS TYPICALLY USED IN SETTING PERFORMANCE REQUIREMENTS

ENVIRONMENTAL CONDITIONS

DAY/NIGHT

- Day
- Night

VISIBILITY TYPE

- Clear
- Fog
- Haze
- Smoke
- Other (To be specified by user)

FLIGHT RULES/CONDITION

- Instrument Flight Rules/Instrument Flight Conditions
- Visual Flight Rules/Visual Flight Conditions

CLIMATE TYPE

- Hot/Dry
- Hot/Humid
- Basic/High Humid
- Basic/Hot
- Basic/Cold
- Cold
- Severe Cold

ALTITUDE

(in feet above ground level in increments selected by the user)

ELECTROMAGNETIC HAZARDS

- With electromagnetic hazards
- Without electromagnetic hazards

## TERRAIN CONDITIONS

### TYPE OF LANDING AREA

Confined Area

Slopes

Pinnacle or Ridge

Water

Normal runway

Others (to be specified by user)

## TARGET/THREAT-RELATED CONDITIONS

### PROTECTIVE GEAR LEVEL

-MOPP Level 0

-MOPP Level 1

-MOPP Level 2

-MOPP Level 3

-MOPP Level 4

-Others(to be specified by user)

### TARGET RANGE

(in meter increments defined by user)

### ELECTROMAGNETIC PULSE (EMP)

-With EMP

-Without EMP

### TYPE OF ELECTRONIC WARFARE

Signal Intercept

Direction Finding

Jamming

Beaconing (Deception)

All of the above

None of the above



GENERAL TARGET TYPE

Armored Vehicle

Light skinned/unarmored vehicle

Troops

Airborne Threat

Fixed threat emplacement

Others (to be specified by user)

CONDITIONS RELATED TO FRIENDLY FORCES

MODES OF FLIGHT

Regular

Terrain

-Low Level

-Contour

-Nap of the Earth

NAVIGATION TECHNIQUE

Radio

FM Homing

Dead Reckoning

Pilotage

Doppler

OMEGA/GPS

Others (to be specified by user)

LOAD TYPE

External

Internal

ADDITIONAL CONDITIONS

ENVIRONMENTAL CONDITIONS

SPECIAL ENVIRONMENTS

Mountain  
Jungle  
Desert  
Winter  
Amphibious

WIND DIRECTION TYPE

Headwind  
Tailwind  
Cross wind  
No wind

WIND DIRECTION-MEASURED

(in degrees from aircraft azimuth in increments selected by user)

WIND VELOCITY

(in knots or in miles per hour in increments selected by user)

PRESSURE

(in millibars in increments selected by user)

TEMPERATURE

(in degrees KELVIN, CELSIUS, or FAHRENHEIT in increments selected by user)

PRECIPITATION

Clear  
Snow  
Ice  
Rain

VISIBILITY (In meters)

## TERRAIN CONDITIONS

### LOAD BEARING CAPACITY OF GROUND

(In tons in increments specified by user)

### GROUND SURFACE STATUS

Dry

Wet

Mud

Ice

Snow

Dust

### SIDE SLOPE OF TERRAIN

(In per cent or in degrees in increments defined by user)

### GRADE SLOPE OF TERRAIN

(In per cent or in degrees in increments defined by user)

### THREAT/TARGET CONDITIONS

### NUMBER OF TARGETS

Single

Multiple

### TARGET EXPOSURE TIME

(In seconds in increments specified by user)

### GROUND TARGET CLASS

Point

Area

### GROUND TARGET SPEED

(In knots or in miles per hour in increments specified by user)

### DIRECTED ENERGY WEAPON

Directed Energy Weapons Present

Directed Energy Weapons Absent

THREAT OBSTACLES

Minefield

Other (To be specified by user)

MOVEMENT STATUS OF GROUND TARGETS

Moving

Stationary

RANGE OF GROUND TARGETS

(in meters in increments selected by user)

ASPECT OF GROUND TARGET

Frontal

Flanking

Oblique

TYPE OF THREAT TARGET ACQUISITION

Visual

Infrared radar/sensor

Air defense radar

Radio direction finding system

Radar direction finding system

Others (to be specified by user)

CONDITIONS RELATED TO FRIENDLY FORCES

TYPE OF SIGHT

Night Vision Goggles

Night Hawk

Naked Eye

Binoculars

Target Acquisition and Designation Sight

Others (to be specified by user)

WEAPON TYPE

7.62 mm machine gun

HELLFIRE

Others (to be specified by user)

FLIGHT MODE

Hover

Moving

DEGRADED MODES OF OPERATION

Engine

One engine operational

Both engines operational

Hydraulic System

Operational

Non- operational

Stability Augmentation System/automatic Flight Control

Operational

Non-operational

AFSC Servo

Operational

Non-operational

Two way radio

Operational

Non-operational

Electrical Control Unit lockout

Operational

Non-operational

Stabilator

Operational

Non-operational

Night Vision Sensor

Operational

Non-operational

TYPE OF NAVIGATIONAL AID

VOR

LOC

ASR

NDB

Others (to be specified by user)

TAKEOFF GROSS WEIGHT

(in lbs. in increments specified by user

MAXIMUM WEIGHT OF LOAD

(in lbs in increments specified by user )

TYPE OF ECCM

Jamming

Chaff

Flares

Others (to be specified by user)

COMMUNICATION MEDIUM

-Two way radio

-Intercom

-Others (To be specified by user)

COMMUNICATION MODE

-Messages encoded and decoded

-Normal message traffic

TYPE OF HIGHER LEVEL UNIT OPERATION BEING SUPPORTED

Offensive

Movement To Contact

Hasty Attack

Deliberate Attack

Exploitation

Pursuit

Reconnaissance In Force

Raid

Feint

Demonstration  
Defensive  
    Covering Force  
    Main Battle  
    Deep Attack  
    Rear Area Operations  
    Retrograde Operations

#### TYPE OF RECONNAISSANCE

Route  
River  
Area  
Zone

#### TYPES OF SECURITY OPERATIONS

Screen  
Guard  
Cover  
Area

#### TECHNIQUES OF MOVEMENT

Traveling  
Traveling overwatch  
Bounding overwatch

#### SPECIAL OPERATIONS

command and control  
courier/messenger  
aerial radio relay  
emergency aerial resupply  
aerial column control/traffic survey  
aerial radiological survey  
aerial artillery observation and adjustment  
amphibious/sea  
parachuting

repelling  
search and rescue  
paradrop  
internal hoist  
aerial mine delivery  
Others (to be specified by user)



TABLE C-19 CONDITIONS TAXONOMY FOR SCOUT HELICOPTER

CONDITIONS TYPICALLY USED IN SETTING PERFORMANCE REQUIREMENTS

ENVIRONMENTAL CONDITIONS

DAY/NIGHT

- Day
- Night

VISIBILITY TYPE

- Clear
- Fog
- Haze
- Smoke
- Other (To be specified by user)

FLIGHT RULES/CONDITION

- Instrument Flight Rules/Instrument Flight Conditions
- Visual Flight Rules/Visual Flight Conditions

CLIMATE TYPE

- Hot/Dry
- Hot/Humid
- Basic/High Humid
- Basic/Hot
- Basic/Cold
- Cold
- Severe Cold

ALTITUDE

(in feet above ground level in increments selected by the user)

ELECTROMAGNETIC HAZARDS

- With electromagnetic hazards

-Without electromagnetic hazards

#### TERRAIN CONDITIONS

##### TYPE OF LANDING AREA

Confined Area

Slopes

Pinnacle or Ridge

Water

Normal runway

Others (to be specified by user)

#### TARGET/THREAT-RELATED CONDITIONS

##### PROTECTIVE GEAR LEVEL

-MOPP Level 0

-MOPP Level 1

-MOPP Level 2

-MOPP Level 3

-MOPP Level 4

-Others(to be specified by user)

##### TARGET RANGE

(in meter increments defined by user)

##### GENERAL TARGET TYPE

Armored Vehicle

Light skinned/unarmored vehicle

Troops

Airborne Threat

Fixed threat emplacement

Others (to be specified by user)

##### ELECTROMAGNETIC PULSE (EMP)

-With EMP

-Without EMP

TYPE OF ELECTRONIC WARFARE

Signal Intercept

Direction Finding

Jamming

Baconing (Deception)

All of the above

None of the above

CONDITIONS RELATED TO FRIENDLY FORCES

MODES OF FLIGHT

Regular

Terrain

-Low Level

-Contour

-Nap of the Earth

NAVIGATION TECHNIQUE

Radio

FM Homing

Dead Reckoning

Pilotage

Doppler

OMEGA/GPS

Others (to be specified by user)

ADDITIONAL CONDITIONS

ENVIRONMENTAL CONDITIONS

SPECIAL ENVIRONMENTS

Mountain

Jungle  
Desert  
Winter  
Amphibious

WIND DIRECTION TYPE

Headwind  
Tailwind  
Cross wind  
No wind

WIND DIRECTION-MEASURED

(in degrees from aircraft azimuth in increments selected by user)

WIND VELOCITY

(in knots or in miles per hour in increments selected by user)

PRESSURE

(in millibars in increments selected by user)

TEMPERATURE

(in degrees KELVIN, CELSIUS, or FAHRENHEIT in increments selected by user)

PRECIPITATION

Clear  
Snow  
Ice  
Rain

VISIBILITY (In meters)

TERRAIN CONDITIONS

LOAD BEARING CAPACITY OF GROUND

(In tons in increments specified by user)

GROUND SURFACE STATUS

Dry  
Wet  
Mud  
Ice  
Snow  
Dust

SIDE SLOPE OF TERRAIN

(In per cent or in degrees in increments defined by user)

GRADE SLOPE OF TERRAIN

(In per cent or in degrees in increments defined by user)

THREAT/TARGET CONDITIONS

NUMBER OF TARGETS

Single  
Multiple

TARGET EXPOSURE TIME

(In seconds in increments specified by user)

GROUND TARGET CLASS

Point  
Area

GROUND TARGET SPEED

(In knots or in miles per hour in increments specified by user)

DIRECTED ENERGY WEAPON

Directed Energy Weapons Present  
Directed Energy Weapons Absent

THREAT OBSTACLES

Minefield

Other (To be specified by user)

MOVEMENT STATUS OF GROUND TARGETS

Moving

Stationary

RANGE OF GROUND TARGETS

(in meters in increments selected by user)

ASPECT OF GROUND TARGET

Frontal

Flanking

Oblique

TYPE OF THREAT TARGET ACQUISITION

Visual

Infrared radar/sensor

Air defense radar

Radio direction finding system

Radar direction finding system

Others (to be specified by user)

CONDITIONS RELATED TO FRIENDLY FORCES

TYPE OF SIGHT

Night Vision Goggles

Night Hawk

Naked Eye

Binoculars

Target Acquisition and Designation Sight

Others (to be specified by user)

WEAPON TYPE

Air to Air Stinger

30-mm cannon  
7.62 mm machine gun  
HELLFIRE  
Others (to be specified by user)

FLIGHT MODE

Hover

Moving

WEAPON MODE

Others (to be specified by user)

DEGRADED MODES OF OPERATION

Engine

One engine operational

Both engines operational

Hydraulic System

Operational

Non- operational

Stability Augmentation System/automatic Flight Control

Operational

Non-operational

AFSC Servo

Operational

Non-operational

Two way radio

Operational

Non-operational

Electrical Control Unit lockout

Operational

Non-operational

Stabilator

Operational

Non-operational

Night Vision Sensor

Operational

Non-operational

TYPE OF NAVIGATIONAL AID

VOR

LOC

ASR

NDB

Others (to be specified by user)

TAKEOFF GROSS WEIGHT

(in lbs. in increments specified by user

MAXIMUM WEIGHT OF LOAD

(in lbs in increments specified by user )

TYPE OF ECCM

Jamming

Chaff

Flares

Others (to be specified by user)

COMMUNICATION MEDIUM

-Two way radio

-Intercom

-Others (To be specified by user)

COMMUNICATION MODE

-Messages encoded and decoded

-Normal message traffic

TYPE OF HIGHER LEVEL UNIT OPERATION BEING SUPPORTED

Offensive

Movement To Contact

Hasty Attack

Deliberate Attack

Exploitation

Pursuit

Reconnaissance In Force



Raid

Feint

Demonstration

Defensive

Covering Force

Main Battle

Deep Attack

Rear Area Operations

Retrograde Operations

#### TYPE OF RECONNAISSANCE

Route

River

Area

Zone

#### TYPES OF SECURITY OPERATIONS

Screen

Guard

Cover

Area

#### TECHNIQUES OF MOVEMENT

Traveling

Traveling overwatch

Bounding overwatch

#### SPECIAL OPERATIONS

command and control

courier/messenger

aerial radio relay

aerial column control/traffic survey

aerial radiological survey

aerial artillery observation and adjustment

amphibious/sea

search and rescue

aerial mine delivery

Others (to be specified by user)

TABLE C-20 CONDITIONS HIERARCHY FOR LIGHT AND HEAVY CARGO TRUCKS

CONDITIONS TYPICALLY USED IN SETTING PERFORMANCE REQUIREMENTS

ENVIRONMENTAL CONDITIONS

DAY/NIGHT

- Day
- Night with Headlights
- Night with Blackout

VISIBILITY TYPE

- Clear
- Fog
- Haze
- Smoke
- Other (To be specified by user)

CLIMATE TYPE

- Hot/Dry
- Hot/Humid
- Basic/High Humid
- Basic/Hot
- Basic/Cold
- Cold
- Severe Cold

TERRAIN CONDITIONS

ROAD TYPE

- Primary
- secondary
- cross country

## TARGET/THREAT-RELATED CONDITIONS

### PROTECTIVE GEAR LEVEL

- MOPP Level 0
- MOPP Level 1
- MOPP Level 2
- MOPP Level 3
- MOPP Level 4
- Others(to be specified by user)

### CONDITIONS RELATED TO FRIENDLY FORCES

#### LOAD SIZE

(In tons in increments specified by user)

### ADDITIONAL CONDITIONS

#### ENVIRONMENTAL CONDITIONS

##### ELECTROMAGNETIC HAZARDS

- With electromagnetic hazards
- Without electromagnetic hazards

##### ELECTROMAGNETIC PULSE (EMP)

- With EMP
- Without EMP

##### SPECIAL ENVIRONMENTS

Mountain  
Jungle  
Desert  
Winter  
Amphibious

##### TEMPERATURE

(in degrees KELVIN, CELSIUS, or FAHRENHEIT in increments selected by user)

HEIGHT ABOVE SEA LEVEL

(in meters in increments selected by user)

PRECIPITATION

Clear

Snow

Ice

Rain

VISIBILITY (In meters)

TERRAIN CONDITIONS

ROAD SURFACE TYPE

-All weather road (concrete or bituminous concrete)

-Limited weather road (crushed rock, waterbound macadam, gravel)

-Fair Weather road (natural or stabilized soil, sand or clay, shell, cinder)

CROSS COUNTRY SURFACE TYPE

-Sand

-Bare packed ground

-Light vegetation

-Dense vegetation

LOAD BEARING CAPACITY OF GROUND/ROAD

(In tons in increments specified by user)

GROUND SURFACE STATUS

Dry

Wet

Mud

Ice  
Snow  
Dust

TYPE OF RAIL, BRIDGE, OR TUNNEL  
(To be specified by user)

CURVATURE OF ROAD  
(Radius in meters in increments to be specified by user)

#### THREAT/TARGET CONDITIONS

##### TYPE OF THREAT ATTACK

Air Attack  
Indirect Fire Attack  
Sniper Fire Attack  
Tank/armored vehicle attack  
NBC Attack  
Attack with Light Antitank Weapon

Others (To be specified by user)

##### TYPE OF THREAT TARGET ACQUISITION

Visual  
Infrared radar/sensor  
Movement sensor  
Pressure sensor  
Others (to be specified by user)

#### CONDITIONS RELATED TO FRIENDLY FORCES

##### LOAD SIZE TYPE

Oversize  
Overweight  
Oversize and Overweight  
Normal

TYPE OF MOVEMENT

Convoy

Other

TYPE OF CARGO

General Cargo

Personnel

Dangerous or Hazardous Materiel

MISSION TYPES

Supply

Evacuation

TYPES OF HAULING

Local Haul

Line Haul

Zonal Haul

METHODS OF HANDLING HAUL

Direct Haul

Shuttle

Relay

METHODS OF OPERATION

Piggyback on trailer or flatcar

Container on flatcar

Roll-on, roll-off

Lift-on, lift-off

Air

Lighter aboard ship

TYPE OF SIGHT

Naked Eye

Night Vision Goggles

Others (To be specified by user)

(In meters in increments specified by user)

TARGET AIRCRAFT SPEED

(In knots or in miles per hour in increments specified by user )

SIZE OF THREAT AIRCRAFT

(In meters in increments specified by user)

TARGET EXPOSURE TIME

(In seconds in increments specified by user)

ALTITUDE OF TARGET

(In feet, increments defined by user)

CONDITIONS RELATED TO FRIENDLY FORCES

BORESIGHT METHOD

Distant Aiming Point

Target

WEAPON TYPE

20mm

Others (To be specified by user)

AMMUNITION TYPE

HEIT-SD, High Explosive Incendiary With Tracer Self-Destroying

HEI, High Explosive Incendiary

TP-T-Target Practice Tracer

TP-Target Practice

Dummy

Others (To be specified by user)

AIR DEFENSE WARNING STATUS

Red-Attack in progress or imminent



Yellow-Attack probable  
White-Attack not probable

WEAPONS CONTROL STATUS

Weapons free  
Weapons tight  
Weapons hold

TYPE OF GROUND SUPPORT

direct fire-perimeter defense  
ground direct fire  
indirect fire

TYPES OF AIR DEFENSE

March Column  
Maneuver Force  
Critical Asset/Combat Support Element  
Company Size Maneuver Force

VEHICLE MOVEMENT

Moving  
Stationary

FIRING RATE

low fire  
high fire

TYPE OF DEFENSE

Static Point  
Mobile Point

SPECIAL OPERATIONS

Airborne Operations  
Air Assault Operations  
Defense of Railroad train

# DEFAULT CONDITIONS FOR EACH TYPE OF SYSTEM

=====

Type System = 1

--

Type of Condition	Condition	Code	Default Value
-----	-----	----	-----
environmental	day/night	p1	day
environmental	visibility	p2	clear
environmental	climate	p3	basic/cold
environmental	electromag.	p4	without
terrain	road type	p1	cross country
terrain	obstacles	p2	forests
terrain	side slope	p3	45 degrees
terrain	grade slope	p4	45 degrees
terrain	ditch gap	p5	4 feet
terrain	walls	p6	2 feet
target/threat	MOPP level	p1	0
target/threat	target range	p2	500 meters
target/threat	EMP	p3	without
target/threat	EW	p4	none
friendly	vehicle move.	p1	stationary

# DEFAULT CONDITIONS FOR EACH TYPE OF SYSTEM

=====

Type System = 2  
--

Type of Condition -----	Condition -----	Code ----	Default Value -----
environmental	day/night	p1	day
environmental	visibility	p2	clear
environmental	climate	p3	basic/cold
environmental	electromag.	p4	without
terrain	road type	p1	cross country
terrain	obstacles	p2	forests
terrain	side slope	p3	45 degrees
terrain	grade slope	p4	45 degrees
terrain	ditch gap	p5	4 feet
terrain	walls	p6	2 feet
target/threat	MOPP level	p1	0
target/threat	target range	p2	1500 meters
target/threat	EMP	p3	without
target/threat	EW	p4	none
friendly	vehicle move.	p1	stationary

DEFAULT CONDITIONS FOR EACH TYPE OF SYSTEM  
=====

Type System = 3  
---

Type of Condition -----	Condition -----	Code -----	Default Value -----
environmental	day/night	p1	day
environmental	visibility	p2	clear
environmental	climate	p3	basic/cold
target/threat	MOPP level	p1	0
target/threat	range	p2	800 meters
target/threat	class	p5	point
target/threat	movement	all	moving

# DEFAULT CONDITIONS FOR EACH TYPE OF SYSTEM

=====

Type System = 4

---

Type of Condition -----	Condition -----	Code -----	Default Value -----
environmental	day/night	p1	day
environmental	visibility	p2	clear
environmental	climate	p3	basic/cold
target/threat	MOPP level	p1	0
target/threat	range	p2	300 meters
target/threat	class	p5	point
target/threat	movement	a11	stationary

# DEFAULT CONDITIONS FOR EACH TYPE OF SYSTEM

=====

Type System = 5

--

Type of Condition	Condition	Code	Default Value
-----	-----	----	-----
environmental	day/night	p1	day
environmental	visibility	p2	clear
environmental	climate	p3	basic/cold
target/threat	MOPP level	p1	0
target/threat	range	p2	300

DEFAULT CONDITIONS FOR EACH TYPE OF SYSTEM  
=====

Type System = 6  
---

Type of Condition -----	Condition -----	Code -----	Default Value -----
environmental	day/night	p1	day
environmental	visibility	p2	clear
environmental	climate	p3	basic/cold
target/threat	MOPP level	p1	0
target/threat	range	p2	400 meters
target/threat	class	p5	area
target/threat	movement	all	moving

DEFAULT CONDITIONS FOR EACH TYPE OF SYSTEM  
=====

Type System = 7  
---

Type of Condition -----	Condition -----	Code ----	Default Value -----
environmental	day/night	p1	day
environmental	visibility	p2	clear
environmental	climate	p3	basic/cold
terrain	load bearing	a3	50 tons
terrain	surface	a4	dry
terrain	side slope	p7	level
terrain	grade	p8	level
target/threat	MOPP level	p1	0
target/threat	range	p2	4000 meters
friendly	firing mode	p2	not observable
friendly	quad. ele.	p3	TBD
friendly	intensity	p4	sustained



# DEFAULT CONDITIONS FOR EACH TYPE OF SYSTEM

=====

Type System = 8

--

Type of Condition -----	Condition -----	Code -----	Default Value -----
environmental	day/night	p1	day
environmental	visibility	p2	clear
environmental	climate	p3	basic/cold
environmental	electromag.	p4	without
terrain	road type	p1	cross country
terrain	obstacles	p2	forests
terrain	side slope	p3	45 degrees
terrain	grade slope	p4	45 degrees
terrain	ditch gap	p5	4 feet
terrain	walls	p6	2 feet
target/threat	MOPP level	p1	0
target/threat	target range	p2	1500 meters
target/threat	EMP	p3	without
target/threat	EW	p4	none
friendly	vehicle move.	p1	stationary

# DEFAULT CONDITIONS FOR EACH TYPE OF SYSTEM

=====

Type System = 9

--

Type of Condition -----	Condition -----	Code ----	Default Value -----
environmental	day/night	p1	day
environmental	visibility	p2	clear
environmental	climate	p3	basic/cold
environmental	electromag.	p4	without
terrain	road type	p1	cross country
terrain	obstacles	p2	forests
terrain	side slope	p3	45 degrees
terrain	grade slope	p4	45 degrees
terrain	ditch gap	p5	4 feet
terrain	walls	p6	2 feet
target/threat	MOPP level	p1	0
target/threat	target range	p2	500 meters
target/threat	EMP	p3	without
target/threat	EW	p4	none
friendly	vehicle move.	p1	stationary

DEFAULT CONDITIONS FOR EACH TYPE OF SYSTEM  
=====

Type System = 10  
--

Type of Condition -----	Condition -----	Code -----	Default Value -----
environmental	day/night	p1	day
environmental	visibility	p2	clear
environmental	climate	p3	basic/cold
environmental	electromag.	p4	without
terrain	road type	p1	cross country
terrain	obstacles	p2	forests
terrain	side slope	p3	45 degrees
terrain	grade slope	p4	45 degrees
terrain	ditch gap	p5	4 feet
target/threat	MOPP level	p1	0
target/threat	target range	p2	<i>100 miles</i> <del>9500 meters</del>
target/threat	EMP	p3	without
target/threat	EW	p4	none
friendly	vehicle move.	p1	stationary
friendly	firing inten.	p4	sustained

# DEFAULT CONDITIONS FOR EACH TYPE OF SYSTEM

=====

Type System = 11  
--

Type of Condition -----	Condition -----	Code -----	Default Value -----
environmental	day/night	p1	day
environmental	visibility	p2	clear
environmental	climate	p3	basic/cold
environmental	electromag.	p4	without
terrain	load bearing	a3	100 tons
terrain	surface	a4	dry
terrain	side slope	p7	level
terrain	grade	p8	level.
target/threat	MOPP level	p1	0
target/threat	target range	p2	9000 meters
target/threat	EMP	p3	without
target/threat	EW	p4	none
friendly	vehicle move.	p1	stationary
friendly	firing inten.	p4	sustained
friendly	firing mode	p2	indirect
friendly	quad. ele.	p3	<del>900 miles</del> TBD

# DEFAULT CONDITIONS FOR EACH TYPE OF SYSTEM

Type System = 12

Type of Condition	Condition	Code	Default Value
environmental	day/night	p1	day
environmental	visibility	p2	clear
environmental	climate	p3	basic/cold
environmental	electromag.	p4	without
terrain	road type	p1	cross country
terrain	obstacles	p2	forests
target/threat	MOPP level	p1	0
target/threat	target range	p2	9000 meters
target/threat	EMP	p3	without
target/threat	EW	p4	none
friendly	vehicle move.	p1	stationary
friendly	firing inten.	p4	sustained
friendly	firing mode	p2	indirect
friendly	quad. ele.	p3	<del>900 miles</del> TBD

DEFAULT CONDITIONS FOR EACH TYPE OF SYSTEM  
=====

Type System = 13  
--

Type of Condition -----	Condition -----	Code -----	Default Value -----
environmental	day/night	p1	day
environmental	visibility	p2	clear
environmental	climate	p3	basic/cold
environmental	electromag.	p4	without
terrain	road type	p1	cross country
terrain	obstacles	p2	forests
target/threat	MOPP level	p1	0
target/threat	target range	p2	3000 meters
target/threat	EMP	p3	without
target/threat	EW	p4	none
friendly	vehicle move.	p1	stationary
friendly	firing inten.	p4	sustained

# DEFAULT CONDITIONS FOR EACH TYPE OF SYSTEM

=====

Type System = 14

--

Type of Condition -----	Condition -----	Code ----	Default Value -----
environmental	day/night	p1	day
environmental	visibility	p2	clear
environmental	climate	p3	basic/cold
environmental	electromag.	p4	without
terrain	road type	p1	cross country
terrain	obstacles	p2	forests
target/threat	type	p6	aircraft
target/threat	MOPP level	p1	0
target/threat	target range	p2	3000 meters
target/threat	EMP	p3	without
target/threat	EW	p4	none
friendly	vehicle move.	p1	stationary
friendly	firing inten.	p4	sustained

# DEFAULT CONDITIONS FOR EACH TYPE OF SYSTEM

=====

Type System = 15

----

Type of Condition -----	Condition -----	Code -----	Default Value -----
environmental	day/night	p1	day
environmental	visibility	p2	clear
environmental	climate	p3	basic/cold
target/threat	MOPP level	p1	0
target/threat	range	p2	2000 meters
target/threat	type	p6	aircraft
friendly	position	a28	foot-march



# DEFAULT CONDITIONS FOR EACH TYPE OF SYSTEM

=====

Type System = 16

---

Type of Condition -----	Condition -----	Code -----	Default Value -----
environmental	day/night	p1	day
environmental	visibility	p2	clear
environmental	climate	p3	basic/cold
environmental	flight rules	p5	visual
environmental	altitude	p6	200 feet
environmental	electromag.	p4	without
terrain	LZ	p9	confined area
target/threat	MOPP level	p1	0
target/threat	range	p2	2000 meters
target/threat	EMP	p3	without
target/threat	type EW	p4	none
target/threat	type target	p6	armored vehicle
friendly	flight mode	a40	low level
friendly	navigation	a41	dead recokoning

# DEFAULT CONDITIONS FOR EACH TYPE OF SYSTEM

=====

Type System = 17

----

Type of Condition -----	Condition -----	Code -----	Default Value -----
environmental	day/night	p1	day
environmental	visibility	p2	clear
environmental	climate	p3	basic/cold
environmental	flight rules	p5	visual
environmental	altitude	p6	200 feet
environmental	electromag.	p4	without
terrain	LZ	p9	confined area
target/threat	MOPP level	p1	0
target/threat	range	p2	500 meters
target/threat	EMP	p3	without
target/threat	type EW	p4	none
target/threat	type target	p6	troops
friendly	flight mode	a40	low level
friendly	navigation	a41	dead reckoning
friendly	load type	a48	internal

# DEFAULT CONDITIONS FOR EACH TYPE OF SYSTEM

=====

Type System = 18

---

Type of Condition -----	Condition -----	Code -----	Default Value -----
environmental	day/night	p1	day
environmental	visibility	p2	clear
environmental	climate	p3	basic/cold
environmental	flight rules	p5	visual
environmental	altitude	p6	200 feet
environmental	electromag.	p4	without
terrain	LZ	p9	confined area
target/threat	MOPP level	p1	0
target/threat	range	p2	500 meters
target/threat	EMP	p3	without
target/threat	type EW	p4	none
target/threat	type target	p6	troops
friendly	flight mode	a40	low level
friendly	navigation	a41	dead reckoning
friendly	load type	a48	internal

# DEFAULT CONDITIONS FOR EACH TYPE OF SYSTEM

=====

Type System = 19

---

Type of Condition -----	Condition -----	Code ----	Default Value -----
environmental	day/night	p1	day
environmental	visibility	p2	clear
environmental	climate	p3	basic/cold
environmental	flight rules	p5	visual
environmental	altitude	p6	200 feet
environmental	electromag.	p4	without
terrain	LZ	p9	confined area
target/threat	MOPP level	p1	0
target/threat	range	p2	500 meters
target/threat	EMP	p3	without
target/threat	type EW	p4	none
target/threat	type target	p6	troops
friendly	flight mode	a40	low level
friendly	navigation	a41	dead reckoning

# DEFAULT CONDITIONS FOR EACH TYPE OF SYSTEM

=====

Type System = 20

--

Type of Condition	Condition	Code	Default Value
-----	-----	-----	-----
environmental	day/night	p1	day
environmental	visibility	p2	clear
environmental	climate	p3	basic/cold
terrain	road type	p1	cross country
target/threat	MOPP level	p1	0
friendly	load size	p5	2 tons

# DEFAULT CONDITIONS FOR EACH TYPE OF SYSTEM

=====

Type System = 21  
---

Type of Condition -----	Condition -----	Code -----	Default Value -----
environmental	day/night	p1	day
environmental	visibility	p2	clear
environmental	climate	p3	basic/cold
terrain	road type	p1	cross country
target/threat	MOPP level	p1	0
friendly	load size	p5	5 tons

#### 4.2.5 - Conditions by Function

In this library, the conditions from the "Conditions by System Type" Library are assigned to the specific functions to which they apply. This library will be used if the user indicates that the conditions for a given mission will vary from function to function. The SPREA will utilize this library so that the user is not burdened with specifying condition settings when that specific condition would have no effect on the function in question.

NUMBER CODE FOR SYSTEM TYPES

=====

1. Infantry fighting vehicle
2. Anti-tank vehicle
3. Man-portable anti-tank weapon
4. Rifle
5. Grenade launcher
6. Automatic weapon
7. Man-portable indirect fire weapon
8. Tank
9. Cavalry fighting vehicle
10. Medium range missile artillery
11. Towed howitzer
12. Self-propelled howitzer
13. Rocket field artillery system
14. Air defense mobile gun
15. Man-portable air defense system
16. Attack helicopter
17. Cargo helicopter
18. Utility helicopter
19. Scout helicopter
20. Light truck
21. Heavy truck



## ENVIRONMENTAL CONDITIONS

=====

### PRIMARY

-----

1. day/night
2. visibility type
3. climate type
4. electromagnetic hazards
5. flight rules/condition
6. altitude (ft. above ground level)

### ADDITIONAL

-----

1. special environments
2. wind direction type
3. wind direction measured
4. wind velocity
5. pressure
6. temperature
7. height above sea level
8. precipitation
9. visibility (in meters)

## TERRAIN CONDITIONS

=====

### PRIMARY

-----

1. road type
2. natural obstacles
3. side slope of obstacle to be crossed
4. grade slope of obstacle to be crossed
5. horizontal gap of ditches to be crossed
6. size of vertical walls to be crossed
7. side slope of terrain
8. grade slope of terrain
9. type of landing area

### ADDITIONAL

-----

1. road surface type
2. cross country surface type
3. load bearing capacity of ground/road
4. ground surface status
5. depth of water obstacle
6. current of river to be forded
7. type of rail, bridge, or tunnel
8. curvature of road

TARGET/THREAT-RELATED CONDITIONS  
=====

PRIMARY  
-----

1. protective gear level
2. target range
3. electromagnetic pulse
4. type of electronic warfare present
5. target class (area or point)
6. target type

ADDITIONAL  
-----

1. general target/threat types
2. threat tank and assault gun types
3. threat armored vehicles
4. threat troop weapon types
5. threat helicopter types
6. threat fixed wing aircraft
7. type of threat attack
8. ground target speed
9. directed energy weapon
10. threat obstacles
11. movement status of ground targets
12. range of ground targets
13. aspect of ground targets
14. number of ground targets
15. target aircraft course
16. range of target aircraft
17. target aircraft speed
18. number of airborne targets
19. target exposure time
20. type of threat target acquisition
21. nuclear target types
22. non nuclear target types
23. target type
24. altitude of target

## CONDITIONS RELATED TO FRIENDLY FORCES

=====

### PRIMARY

-----

1. vehicle movement status
2. firing mode
3. quadrant elevations
4. firing intensity
5. load size

### ADDITIONAL

-----

1. fire distribution type
2. fire height
3. type of gunnery
4. multiple target fire patterns
5. weapon types
6. rate of fire
7. type of sight
8. ammunition type
9. method for determining target range
10. type of power for fire control
11. sight modes
12. condition of vehicle hatches
13. communication medium
14. communication mode
15. type of higher level unit operation being supported
16. type of movement when not in contact with enemy
17. formation type
18. type of offensive operation
19. type of defensive operation
20. TOW firing conditions
21. type of field of view (FOV)
22. aerial engagement method
23. combat patrol missions
24. platform (ground or mounted)
25. method for laying mortar
26. boresight mechanism
27. method for setting deflection
28. firing position
29. mode of fire
30. target detection technique
31. gunnery technique
32. degraded modes of equipment operation

33. propellant type
34. mechanisms for converting calls for fire into firing data
35. weapons control status
36. air defense warning status
37. types of air defense
38. initial engagement position
39. special operations
40. modes of flight
41. navigation technique
42. aft pilot status
43. type of navigational aid
44. takeoff gross weight
45. type of ECCM
46. type of reconnaissance
47. types of security operations
48. load type
49. load size type
50. type of cargo
51. types of hauling
52. methods of hauling

TYP SYS	FUNC- TION	ENVIRONMENTAL CONDITIONS	TERRAIN CONDITIONS	THREAT CONDITIONS	FRIENDLY CONDITIONS
1	1	p1,p2,p3,a1,a8,a9	n/a	p1,a1	a13,a14,a18,a19,a32
1	2	p1,p2,p3,a1,a8,a9	p1-p6,a1-a8	p1,a1,a10	a12,a13,a16-a19,a23,a32
1	3	p1,p2,p3,a1,a8,a9	p2-p6,a2-a4	p1,a1,a10	a12,a13,a17-a19,a23,a32
1	4	p1,p2,p3,a1,a8,a9	p1-p6,a1-a8	p1,a1,a10	a12,a13,a16-a19,a23,a32
1	5	p4,a1,a8	n/a	p1,p3,p4,a1	a13,a14,a18,a19,a32
1	6	p1-p4,a1,a8,a9	n/a	p1-p6,a1-a24	p1,a7,a9-a12,a21,a30,a32
1	7	p1-p3,a1-a4,a8,a9	n/a	p1-p6,a1-a24	p1,p2,a1-a12,a20-a22,a29,a32
1	8	p1-p3,a1,a8,a9	p2,p7,p8,a3,a4	p1,a1,a10,a20	a5,a7,a13,a18,a19,a32
1	9	p1-p4,a1,a8,a9	n/a	p1-p4,p6,a1,a11-a14	a1,a9,a12,a13,a32
1	10	p1-p3,a1	p7,p8,a3,a4	p1,a1	p5,a12,a32
1	11	p1-p3,a1,a8,a9	n/a	p1	p1,a12,a18,a19,a32
1	12	p1,p2,p3,a1	n/a	p1,a1	a32
2	1	p1,p2,p3,a1,a8,a9	n/a	p1,a1	a13,a14,a18,a19,a32
2	2	p1,p2,p3,a1,a8,a9	p1-p6,a1-a8	p1,a1,a10	a12,a13,a16-a19,a23,a32
2	3	p1,p2,p3,a1,a8,a9	p2-p6,a2-a4	p1,a1,a10	a12,a13,a17-a19,a23,a32
2	4	p1,p2,p3,a1,a8,a9	p1-p6,a1-a8	p1,a1,a10	a12,a13,a16-a19,a23,a32
2	5	p4,a1,a8	n/a	p1,p3,p4,a1	a13,a14,a18,a19,a32
2	6	p1-p4,a1,a8,a9	n/a	p1-p6,a1-a24	p1,a7,a9-a12,a21,a30,a32
2	7	p1-p3,a1-a4,a8,a9	n/a	p1-p6,a1-a24	p1,p2,a1-a12,a20-a22,a29,a32
2	8	p1-p3,a1,a8,a9	p2,p7,p8,a3,a4	p1,a1,a10,a20	a5,a7,a13,a18,a19,a32
2	9	p1-p4,a1,a8,a9	n/a	p1-p4,p6,a1,a11-a14	a1,a9,a12,a13,a32
2	10	p1-p3,a1	p7,p8,a3,a4	p1,a1	p5,a12,a32
2	11	p1-p3,a1,a8,a9	n/a	p1	p1,a12,a18,a19,a32
2	12	p1,p2,p3,a1	n/a	p1,a1	a32
3	1	p1,p2,p3,a1,a8,a9	n/a	p1	n/a
3	2	p1,p2,p3,a1,a8,a9	n/a	p1	n/a
3	3	p1,p2,p3,a1,a8,a9	n/a	p1,a1	a18,a19,a28
3	4	p1,p2,p3,a1,a8,a9	n/a	p1,p2,a1,a11,a20	a7,a30
3	5	p1,p2,p3,a1,a8,a9	n/a	p1,p2,a2,a8-a14	a7,a9,a30
3	6	p1,p2,p3,a1,a8,a9	n/a	p1	n/a
3	7	p1,p2,p3,a1,a8,a9	n/a	p1	n/a
4	1	p1,p2,p3,a1,a8,a9	n/a	p1	n/a
4	2	p1,p2,p3,a1,a8,a9	n/a	p1	n/a
4	3	p1,p2,p3,a1,a8,a9	n/a	p1	a28
4	4	p1,p2,p3,a1,a8,a9	n/a	p1,p2,p6,a11-a14	a7,a30
4	5	p1-p3,a1-a4,a8,a9	n/a	p1,p2,p5,p6,a7-a14	p2,a1,a2,a7,a30
4	6	p1,p2,p3,a1,a8,a9	n/a	p1	n/a
4	7	p1,p2,p3,a1,a8,a9	n/a	p1	n/a

TYPE SYSTEM	FUNCTION	ENVIRONMENTAL CONDITIONS	TERRAIN CONDITIONS	THREAT CONDITIONS	FRIENDLY CONDITIONS
5	1	p1,p2,p3,a1,a8,a9	n/a	p1	n/a
5	2	p1,p2,p3,a1,a8,a9	n/a	p1	n/a
5	3	p1,p2,p3,a1,a8,a9	n/a	p1	a28
5	4	p1,p2,p3,a1,a8,a9	n/a	p1,p2,p6,a11-a14	a7,a30
5	5	p1-p3,a1-a4,a8,a9	n/a	p1,p2,p5,p6,a7-a14	a7,a8,a30
5	6	p1,p2,p3,a1,a8,a9	n/a	p1	n/a
5	7	p1,p2,p3,a1,a8,a9	n/a	p1	n/a
6	1	p1,p2,p3,a1,a8,a9	n/a	p1	n/a
6	2	p1,p2,p3,a1,a8,a9	n/a	p1	n/a
6	3	p1,p2,p3,a1,a8,a9	n/a	p1	a28
6	4	p1,p2,p3,a1,a8,a9	n/a	p1,p2,p6,a11-a14	a7,a30
6	5	p1-p3,a1-a4,a8,a9	n/a	p1,p2,p5,p6,a7-a14	p2,a1,a2,a7,a30
6	6	p1,p2,p3,a1,a8,a9	n/a	p1	n/a
6	7	p1,p2,p3,a1,a8,a9	n/a	p1	n/a
7	1	p1,p2,p3,a1,a8,a9	n/a	p1	n/a
7	2	p1,p2,p3,a1,a8,a9	p7,p8,a3,a4	p1	a7,a8,a24-a27
7	3	p1-p3,a1-a9	p7,p8,a3,a4	p1,p2,p6,a20	p2-p4,a4,a7,a8,a24,a27,a34
7	4	p1-p3,a1-a9	p7,p8,a3,a4	p1,p2,p6,a20	p2-p4,a4,a7,a8,a24,a27,a34
7	5	p1,p2,p3,a1,a8,a9	n/a	p1	n/a
7	6	p1,p2,p3,a1,a8,a9	n/a	p1	n/a
8	1	p1,p2,p3,a1,a8,a9	n/a	p1,a1	a13,a14,a18,a19,a32
8	2	p1,p2,p3,a1,a8,a9	p1-p6,a1-a8	p1,a1,a10	a12,a13,a16-a19,a23,a32
8	3	p1,p2,p3,a1,a8,a9	p2-p6,a2-a4	p1,a1,a10	a12,a13,a17-a19,a23,a32
8	4	p1,p2,p3,a1,a8,a9	p1-p6,a1-a8	p1,a1,a10	a12,a13,a16-a19,a23,a32
8	5	p4,a1,a8	n/a	p1,p3,p4,a1	a13,a14,a18,a19,a32
8	6	p1-p4,a1,a8,a9	n/a	p1-p6,a1-a24	p1,a7,a9-a12,a21,a30,a32
8	7	p1-p3,a1-a4,a8,a9	n/a	p1-p6,a1-a24	p1,p2,a1-a12,a21,a22,a29-a32
8	8	p1-p3,a1,a8,a9	p2,p7,p8,a3,a4	p1,a1,a10,a20	a5,a7,a13,a18,a19,a32
8	9	p1-p4,a1,a8,a9	n/a	p1-p4,p6,a1,a11-a14	a1,a9,a12,a13,a32
8	10	p1-p3,a1	p7,p8,a3,a4	p1,a1	p5,a12,a32
8	11	p1-p3,a1,a8,a9	n/a	p1	p1,a12,a18,a19,a32
8	12	p1,p2,p3,a1	n/a	p1,a1	a32

TYPE SYSTEM	FUNCTION	ENVIRONMENTAL CONDITIONS	TERRAIN CONDITIONS	THREAT CONDITIONS	FRIENDLY CONDITIONS
9	1	p1,p2,p3,a1,a8,a9	n/a	p1,a1	a13,a14,a18,a19,a32
9	2	p1,p2,p3,a1,a8,a9	p1-p6,a1-a8	p1,a1,a10	a12,a13,a16-a19,a23,a32
9	3	p1,p2,p3,a1,a8,a9	p2-p6,a2-a4	p1,a1,a10	a12,a13,a17-a19,a23,a32
9	4	p1,p2,p3,a1,a8,a9	p1-p6,a1-a8	p1,a1,a10	a12,a13,a16-a19,a23,a32
9	5	p4,a1,a8	n/a	p1,p3,p4,a1	a13,a14,a18,a19,a32
9	6	p1-p4,a1,a8,a9	n/a	p1-p6,a1-a24	p1,a7,a9-a12,a21,a30,a32
9	7	p1-p3,a1-a4,a8,a9	n/a	p1-p6,a1-a24	p1,p2,a1-a12,a20-a22,a29,a32
9	8	p1-p3,a1,a8,a9	p2,p7,p8,a3,a4	p1,a1,a10,a20	a5,a7,a13,a18,a19,a32
9	9	p1-p4,a1,a8,a9	n/a	p1-p4,p6,a1,a11-a14	a1,a9,a12,a13,a32
9	10	p1-p3,a1	p7,p8,a3,a4	p1,a1	p5,a12,a32
9	11	p1-p3,a1,a8,a9	n/a	p1	p1,a12,a18,a19,a32
9	12	p1,p2,p3,a1	n/a	p1,a1	a32
10	1	p1-p3,a1,a8,a9	n/a	p1,a1	a13,a14,a18,a19,a32
10	2	p1-p3,a1,a8,a9	p1-p6,a1-a8	p1,a1,a10	a12-a16,a32
10	3	p1-p3,a1,a8,a9	p1-p6,a1-a8	p1,a1,a10	a12-a16,a32
10	4	p4,a1,a8	n/a	p1,p3,p4,a1	a13,a14,a18,a19,a32
10	5	p1-p4,a1-a9	p7,p8,a3,a4	p1,p3,p4,a1	a13,a14,a18,a19,a32
10	6	p1-p4,a1-a9	p7,p8,a3,a4	p1,p3,p4,a1	a13,a14,a18,a19,a32
10	7	p1-p4,a1-a9	p7,p8,a3,a4	p1-p4,a1,a7,a21,a22	a8,a13,a14,
10	8	p1-p3,a1,a8,a9	n/a	p1,a1	a13,a14,a18,a19,a32
10	9	p1-p4,a1-a9	n/a	p1,a1	a13,a14,a18,a19,a32
10	10	p1-p4,a1-a9	n/a	p1,a1	a13,a14,a18,a19,a32
10	11	p1-p4,a1-a9	n/a	p1,a1	a13,a14,a18,a19,a32
10	12	p1-p4,a1-a9	p7,p8,a3,a4	p1,p3,p4,a1	a13,a14,a18,a19,a32
11	1	p1-p3,a1,a8,a9	n/a	p1,a1	a13,a14,a18,a19,a32
11	2	p1-p3,a1,a8,a9	p1-p6,a1-a8	p1,a1,a10	a13-a19,a32
11	3	p1-p4,a1-a9	p7,p8,a3,a4	p1,p3,p4,a1	a13,a14,a18,a19,a32
11	4	p1-p4,a1-a9	p7,p8,a3,a4	p1,p3,p4,a1	a13,a14,a18,a19,a32
11	5	p1-p4,a1-a9	n/a	p1,a1	p2-p4,a4,a7,a8,a15,a32,a33,a34
11	6	p1-p4,a1-a9	p7,p8,a3,a4	p1-p6,a1-a3,a7,a20	p2-p4,a4,a7-a11,a27,a30-a34
11	7	p1-p3,a1,a8,a9	p7,p8,a3,a4	p1-p6,a1-a5,a8-a14	p2-p4,a7-a11,a32
11	8	p1-p3,a1,a8,a9	p1-p6,a1-a8	p1,a1,a10	a13-a19,a32
11	9	p4,a1,a8	n/a	p1,p3,p4,a1	a13,a14,a18,a19,a32
11	10	p1-p3,a1,a8,a9	p1-p8,a1-a8	p1,a1,a10	a32
11	11	p1-p3,a1,a8,a9	n/a	p1,a1	a32
11	12	p1-p3,a1,a8,a9	n/a	p1,a1	a13,a14,a18,a19,a32



TYPE SYSTEM	FUNC- TION	ENVIRONMENTAL CONDITIONS	TERRAIN CONDITIONS	THREAT CONDITIONS	FRIENDLY CONDITIONS
12	1	p1-p3,a1,a8,a9	n/a	p1,a1	a13,a14,a18,a19,a32
12	2	p1-p3,a1,a8,a9	p1-p6,a1-a8	p1,a1,a10	a13-a19,a32
12	3	p1-p4,a1-a9	p7,p8,a3,a4	p1,p3,p4,a1	a13,a14,a18,a19,a32
12	4	p1-p4,a1-a9	p7,p8,a3,a4	p1,p3,p4,a1	a13,a14,a18,a19,a32
12	5	p1-p4,a1-a9	n/a	p1,a1	p2-p4,a4,a7,a8,a15,a32,a33,a34
12	6	p1-p4,a1-a9	p7,p8,a3,a4	p1-p6,a1-a3,a7,a20	p2-p4,a4,a7-a11,a27,a30-a34
12	7	p1-p3,a1,a8,a9	p7,p8,a3,a4	p1-p6,a1-a5,a8-a14	p2-p4,a7-a11,a32
12	8	p1-p3,a1,a8,a9	n/a	p1,p2,a4-a9,a11-a19,a23	p1,a6-a9,a22,a32
12	9	p1-p3,a1,a8,a9	p1-p6,a1-a8	p1,a1,a10	a13-a19,a32
12	10	p4,a1,a8	n/a	p1,p3,p4,a1	a13,a14,a18,a19,a32
12	11	p1-p3,a1,a8,a9	p1-p8,a1-a8	p1,a1,a10	a32
12	12	p1-p3,a1,a8,a9	n/a	p1,a1	a32
12	13	p1-p3,a1,a8,a9	n/a	p1,a1	a13,a14,a18,a19,a32

13 TBD

14	1	p1-p3,a1,a8,a9	n/a	p1,a1	a13,a35,a36
14	2	p1-p3,a1,a8,a9	p1-p6,a1-a8	p1,a1,a10	a12-a19,a32,a35-a37
14	3	p1-p3,a1,a8,a9	p7,p8,a3,a4	p1	a13-a15,a32,a35-a37
14	4	p1-p3,a1,a8,a9	p7,p8,a3,a4	p1	a13-a15,a26,a32,a35-a37
14	5	p1-p3,a1,a8,a9	n/a	p1	p1,a8,a13,a32,a37
14	6	p1-p4,a1,a8,a9	n/a	p1-p4,a5,a6,a15-a19,a24	p1,a7,a11,a21,a30,a32,a37
14	7	p1-p4,a1-a9	p7,p8,a3,a4	p1-p4,a5,a6,a15-a19,a24	p1,a7,a11,a21,a30,a32,a35-a37
14	8	p1-p4,a1-a9	p7,p8,a3,a4	p1,p2,a2-a4,a8-a14	
14	9	p1-p3,a1,a8,a9	p1-p6,a1-a8	p1,a1,a10	a13-a19,a32
14	10	p4,a1,a8	n/a	p1,p3,p4,a1	a13,a14,a18,a19,a32
14	11	p1-p3,a1,a8,a9	p1-p8,a1-a8	p1,a1,a10	a32
14	12	p1-p4,a1-a9	p7,p8,a3,a4	p1,p3,p4,a1	a13,a14,a18,a19,a32
14	13	p1-p3,a1,a8,a9	n/a	p1,a1	a13,a14,a18,a19,a32
14	14	p1-p3,a1,a8,a9	n/a	p1,a1	a32

15	1	p1-p3,a1,a8,a9	n/a	p1,a1	n/a
15	2	p1-p3,a1,a8,a9	n/a	p1,a1	a35-a37
15	3	p1-p3,a1,a8,a9	a4	p1,a1	a35-a37
15	4	p1-p3,a1,a8,a9	n/a	p1-p4,a5,a6,a15-a19,a24	a7,a35-a38
15	5	p1-p3,a1-a9	n/a	p1-p4,a5,a6,a15-a19,a24	a7,a32,a35-a38
15	6	p1-p3,a1,a8,a9	n/a	p1,a1	a32,a35-a37
15	7	p1-p3,a1,a8,a9	n/a	p1,a1	n/a

TYPE SYSTEM	FUNCTION	ENVIRONMENTAL CONDITIONS	TERRAIN CONDITIONS	THREAT CONDITIONS	FRIENDLY CONDITIONS
16	1	p1-p5,a1-a9	n/a	p1,a1	n/a
16	2	p1-p5,a1-a9	a4	p1,a1	a32,a42-a44,
16	3	p1-p6,a1-a9	n/a	p1,a1	a32,a40-a43
16	4	p1-p6,a1-a9	n/a	p1,p3,p4,a1	a32,a40-a43,a45
16	5	p1-p6,a1,a7-a9	n/a	p1,p3,p4,a1	a13,a14,a32,a40,a45
16	6	p1-p5,a1-a9	p7-p9,a3,a4	p1,a1,a10	a32,a40-a43,a45
16	7	p1-p3,a1-a9	p9	p1,a1	n/a
16	8	p1-p6,a1-a9	p9	p1	a32,a40,a42
16	9	p1-p6,a1-a9	n/a	p1-p6,a1-a20,a24	a5,a7,a15,a21,a30,a32,a40-a43
16	10	p1-p6,a1-a9	n/a	p1-p6,a1-a20,a24	a5,a7,a15,a21,a30,a32,a40-a43
16	11	p1-p6,a1-a9	n/a	p1,p3,p4,a1	a32,a40-a43,a45
16	12	p1-p6,a1-a9	n/a	p1,a1	a15,a32,a40-a43,a46
16	13	p1-p6,a1-a9	n/a	p1-p6,a1	a13-a15,a32,a40-a43
17	1	p1-p5,a1-a9	n/a	p1,a1	n/a
17	2	p1-p5,a1-a9	a4	p1,a1	a32,a42-a44,a48
17	3	p1-p6,a1-a9	n/a	p1,a1	a32,a40-a43,a48
17	4	p1-p6,a1-a9	n/a	p1,p3,p4,a1	a32,a40-a43,a45
17	5	p1-p6,a1,a7-a9	n/a	p1,p3,p4,a1	a13,a14,a32,a40,a45
17	6	p1-p5,a1-a9	p7-p9,a3,a4	p1,a1,a10	a32,a40-a43,a45,a48
17	7	p1-p3,a1-a9	p9	p1,a1	n/a
17	8	p1-p6,a1-a9	p9	p1	a32,a40,a42,a48
17	9	p1-p6,a1-a9	n/a	p1-p6,a1-a20,a24	a5,a7,a15,a21,a30,a32,a40-a43
17	10	p1-p6,a1-a9	n/a	p1-p6,a1-a20,a24	a5,a7,a15,a21,a30,a32,a40-a43
17	11	p1-p6,a1-a9	n/a	p1,p3,p4,a1	a32,a40-a43,a45
17	12	p1-p3,a1-a9	p9,a4	p1,a1	a32
17	13	p1-p3,p6,a1-a9	p9,a4	p1,a1	a32,a49
17	14	p1-p3,p6,a1-a9	p9,a4	p1,a1	a32,a40-a43,a49
17	15	p1-p6,a1-a9	p9,a4	p1,a1	a32
17	16	p1-p6,a1-a9	n/a	p1,a1	a15,a32,a40-a43,a46
17	17	p1-p6,a1-a9	n/a	p1-p6,a1	a13-a15,a32,a40-a43
18	1	p1-p5,a1-a9	n/a	p1,a1	n/a
18	2	p1-p5,a1-a9	a4	p1,a1	a32,a42-a44,a48
18	3	p1-p6,a1-a9	n/a	p1,a1	a32,a40-a43,a48
18	4	p1-p6,a1-a9	n/a	p1,p3,p4,a1	a32,a40-a43,a45
18	5	p1-p6,a1,a7-a9	n/a	p1,p3,p4,a1	a13,a14,a32,a40,a45
18	6	p1-p5,a1-a9	p7-p9,a3,a4	p1,a1,a10	a32,a40-a43,a45,a48
18	7	p1-p3,a1-a9	p9	p1,a1	n/a
18	8	p1-p6,a1-a9	p9	p1	a32,a40,a42,a48
18	9	p1-p6,a1-a9	n/a	p1-p6,a1-a20,a24	a5,a7,a15,a21,a30,a32,a40-a43
18	10	p1-p6,a1-a9	n/a	p1-p6,a1-a20,a24	a5,a7,a15,a21,a30,a32,a40-a43
18	11	p1-p6,a1-a9	n/a	p1,p3,p4,a1	a32,a40-a43,a45
18	12	p1-p3,a1-a9	p9,a4	p1,a1	a32
18	13	p1-p3,p6,a1-a9	p9,a4	p1,a1	a32,a49
18	14	p1-p3,p6,a1-a9	p9,a4	p1,a1	a32,a40-a43,a49
18	15	p1-p6,a1-a9	p9,a4	p1,a1	a32
18	16	p1-p6,a1-a9	n/a	p1,a1	a15,a32,a40-a43,a46
18	17	p1-p6,a1-a9	n/a	p1-p6,a1	a13-a15,a32,a40-a43

TYPE SYSTEM	FUNCTION	ENVIRONMENTAL CONDITIONS	TERRAIN CONDITIONS	THREAT CONDITIONS	FRIENDLY CONDITIONS
19	1	p1-p5,a1-a9	n/a	p1,a1	n/a
19	2	p1-p5,a1-a9	a4	p1,a1	a32,a42-a44,
19	3	p1-p6,a1-a9	n/a	p1,a1	a32,a40-a43
19	4	p1-p6,a1-a9	n/a	p1,p3,p4,a1	a32,a40-a43,a45
19	5	p1-p6,a1,a7-a9	n/a	p1,p3,p4,a1	a13,a14,a32,a40,a45
19	6	p1-p5,a1-a9	p7-p9,a3,a4	p1,a1,a10	a32,a40-a43,a45
19	7	p1-p3,a1-a9	p9	p1,a1	n/a
19	8	p1-p6,a1-a9	p9	p1	a32,a40,a42
19	9	p1-p6,a1-a9	n/a	p1-p6,a1-a20,a24	a5,a7,a15,a21,a30,a32,a40-a43
19	10	p1-p6,a1-a9	n/a	p1-p6,a1-a20,a24	a5,a7,a15,a21,a30,a32,a40-a43
19	11	p1-p6,a1-a9	n/a	p1,p3,p4,a1	a32,a40-a43,a45
19	12	p1-p6,a1-a9	n/a	p1,a1	a15,a32,a40-a43,a46
19	13	p1-p6,a1-a9	n/a	p1-p6,a1	a13-a15,a32,a40-a43
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20	1	p1-p3,a1,a8,a9	n/a	p1,a1	n/a
20	2	p1-p3,a1,a8,a9	a3,a4	p1,a1	p5,a32,a50
20	3	p1-p3,a1,a8,a9	p1-p6,a1-a8	p1,a1,a10	p5,a32,a49-a52
20	4	p1-p3,a1,a8,a9	p1-p6,a1-a8	p1,a1,a10	p5,a32,a49-a52
20	5	p1-p3,a1,a8,a9	p1-p6,a1-a8	p1,a1	p5,a32,a49-a52
20	6	p1-p3,a1,a8,a9	a3,a4	p1,a1	p5,a32,a50
20	7	p1-p3,a1,a8,a9	n/a	p1,a1	n/a
-----					
21	1	p1-p3,a1,a8,a9	n/a	p1,a1	n/a
21	2	p1-p3,a1,a8,a9	a3,a4	p1,a1	p5,a32,a50
21	3	p1-p3,a1,a8,a9	p1-p6,a1-a8	p1,a1,a10	p5,a32,a49-a52
21	4	p1-p3,a1,a8,a9	p1-p6,a1-a8	p1,a1,a10	p5,a32,a49-a52
21	5	p1-p3,a1,a8,a9	p1-p6,a1-a8	p1,a1	p5,a32,a49-a52
21	6	p1-p3,a1,a8,a9	a3,a4	p1,a1	p5,a32,a50
21	7	p1-p3,a1,a8,a9	n/a	p1,a1	n/a
-----					

## FUNCTIONAL GROUPS

=====

### (1) PREPARATION

- Plan and prepare mission
- Perform post operations tasks
- Prepare weapon for firing
- Perform post firing tasks
- Conduct pre-operational inspection
- Prepare for march order

### (2) OCCUPY TERRAIN

- Emplace weapon system
- Occupy defensive position
- Get into firing position
- Displace weapon system

### (3) GROUND MOVEMENT

- Execute movement
- Execute maneuver
- Navigate
- Move to firing point
- Drive/move weapon

### (4) AIR MOVEMENT

- Takeoff
- Fly aircraft to/from mission area
- Navigate
- Approach and land aircraft
- Perform reconnaissance

### (5) TARGET ENGAGEMENT

- Acquire targets
- Engage targets
- Detect/locate targets
- Fire weapon
- Attack target
- Adjust supporting fire

### (6) COMMUNICATE

- Communicate
- Call for supporting fire

### (7) TRANSPORT

- Transport combat troops
- Load/unload internal loads
- Raise/lower external loads

(7) TRANSPORT (cont.)

- Perform paradrop
- Prepare load
- Load/unload vehicle

(8) MAINTENANCE

- Compensate for equipment malfunctions and emergencies
- Clear/recover from misfire
- Execute failure to fire procedures

CONDITIONS MOST IMPORTANT BY FUNCTIONAL GROUP  
=====

(1) Preparation

- Day/night
- Visibility
- Climate
- Protective gear level
- Threat/enemy situation
- Type of offensive/defensive operation
- Type of communications (if any)

(2) Occupy terrain

- Day/night
- Visibility
- Climate
- Type of terrain
- Protective gear level
- Ground surface status
- Precipitation
- Threat/enemy situation

(3) Ground movement

- Day/night
- Visibility
- Climate
- Road type
- Cross country surface type
- Natural obstacles
- Man made obstacles
- Slope of terrain
- Precipitation
- Protective gear level
- Ground surface status
- Type of movement
- Formation type
- Degraded mode of operation
- Threat/enemy situation

(4) Air movement

- Day/night
- Visibility
- Climate
- Electromagnetic hazards
- Protective gear level
- Type of electronic warfare present
- Type of environment
- Wind conditions
- Temperature
- Altitude

(4) Air movement (cont.)

- Precipitation
- Communications situation
- Formation flight
- Terrain contour
- Mode of flight
- Navigation technique
- Type and weight of load
- Type of landing area
- Type of operation
- Degraded mode of operation
- Threat/enemy situation

(5) Target engagement

- Day/night
- Visibility
- Type terrain/line of sight
- Protective gear level
- Target range
- Target type
- Target movement
- Firer movement
- Wind conditions
- Precipitation
- Target aspect
- Target exposure time
- Number of targets
- Type of target acquisition
- Firing mode
- Other friendly or supporting fires present
- Type of communications available
- Weapons control status (i.e. free, tight)

(6) Communicate

- Electromagnetic hazards
- Type terrain/line of sight
- Protective gear level
- Type of electronic warfare present
- Precipitation
- Communication medium
- Type of operation
- Threat/enemy situation

(7) Transport

- Protective gear level
- Load bearing capacity of ground
- Temperature & barometric pressure
- Wind conditions
- Degraded mode of operation
- Type of cargo

(7) Transport (cont.)

- Threat/enemy situation

(8) Maintenance

- Visibility
- Climate type
- Protective gear level
- Temperature
- Precipitation
- Other weapons available
- Day/night
- Type of operation
- Threat/enemy situation



#### 4.2.6 - Function Sequence by Mission

This library will contain a description of the most likely sequence of functions within a given mission, for a given system type. This function sequence will be presented to the user during Step 6 of the SPREA process.

# UTILITY HELICOPTER FUNCTION SEQUENCE

(Mission = Troop Insertion)

Plan + Prepare  
for Mission

Load Internal  
Load

Taxi +  
Takeoff

Fly Aircraft  
to Mission Area

Navigate

Approach +  
Land Aircraft

Unload,  
Enter Load

Fly Aircraft  
from  
Mission Area

Navigate

Approach +  
Land Aircraft

Perform After  
Landing Tasks

Communicate

Compensate for Inflight  
Equip Malfunctions + Error,

Compensate for Inflight  
Equip Malfunction + Error,

Defend Against Attack

Call for Direct Support

#### 4.2.7 - Task Sequence by Function

This library will contain a description of the most likely sequence of tasks within a given function, for a specific system type. This task sequence will be present to the user during Step 9 of the SPREA process.

#### 4.2.8 - Generic Equipment by System Type

This library lists the generic equipment categories for each of the various system types. Within each system type, the equipment is broken down into levels: The first level is rather general, as in power plant, electrical system, etc., while the second level is more specific such as main armament, secondary armament, smoke grenade launchers, and missile launchers grouped under the general category of armament system.

The "Generic Equipment by System Type Library" is particularly relevant when calculating maintainability requirements. The maintainability portion of the SPREA system calls for maintenance requirements to be estimated at the ORG, DS, and GS levels for the appropriate equipment for each system. It is from this "Generic Equipment by System Type" Library that the appropriate equipment is selected.

## GENERIC EQUIPMENT LIST

### Aviation Systems

- Airframe
- Landing Gear
- Hydraulic System
- Instruments
- Power Plant
  - Engine System
  - Engine Droop Compensator Control System
  - Engine Oil Storage/Supply System
  - Oil Cooling System
  - Engine Air Induction/Exhaust System
  - Engine Throttle Control System
- Fuel System
  - Fuel Supply System
  - Fuel Control System
- Transmission & Rotor System
  - Main Drive Shaft Systems
  - Transmission/Mast Drive System
  - Tail Rotor Drive System
  - Transmission Oil Cooler System
  - Main Rotor System
  - Tail Rotor System
- Electrical System
  - Electrical DC Power System
  - Electrical AC Power System
  - Lighting System
- Flight Control
  - Cyclic Control System
  - Collective Pitch Control System
  - Directional Control System
  - Synchronized Elevator Control System
  - Stability Control Augmentation System (SCAS)

## Aviation Systems (continued)

- Utility System
  - Caution Panel System
  - Warning System
  - Environmental Control System
  - Sound Proofing System
  - Special Tools & Equipment
- Avionics
  - FM Radio
  - UHF Radio
  - VHF Radio
  - Intercom
  - Transponder
  - UHF & VHF Antenna System
  - Gyrosync Compass
  - Direction Finder Set
  - Radar Warning Receiver
  - VOR/LOC/GS/MB System
  - Mounting Equipment Rack
- Armament
  - Turret Weapons System
  - Wing Weapons System
  - Missile System
  - Aircraft/Missile Interface
  - Rocket Management System
  - Helmet Sight System
  - Fire Control Computer
  - Head-up Display System

## GENERIC EQUIPMENT LIST

### Tactical Trucks

- Power Plant
- Power Train
- Cooling System
- Fuel System
- Exhaust System
- Electrical System
- Brake System
- Suspension & Steering System
- Ventilation System
- Controls & Linkages
- Wheel Assemblies & Tires
- Cab Assembly
- Frame
- Bed

## GENERIC EQUIPMENT LIST

### Infantry/Cavalry Fighting Vehicles

- Power Plant
- Power Train
- Tracks & Suspension
- Steering & Braking System
- Fuel System
- Electrical System
- Hydraulic System
- Ventilation System
- Chassis, Armor Plating & Crew Compartments
- Instruments & Gauges
- Communications System
- Fire Control System
- Armament System
  - Main Armament
  - Secondary Armament
  - Smoke Grenade Launchers
  - Missile Launchers
- Turret Drive & Stabilization System
- Auxiliary Systems
  - Fire Suppression
  - Decontamination
  - Climate Control
  - Night Vision



## GENERIC EQUIPMENT LIST

### Antitank Vehicles

- Power Train
- Tracks & Suspension System
- Power Plant
- Fuel System
- Electrical System
- Ventilation System
- Instruments & Gauges
- Steering & Braking System/Vehicle Control System
- Periscopes/Optical System
- Machine Gun & Mount/Smoke Grenade Launcher
- Hydraulic System
- Guided Missile Turret Assembly
- Missile Launcher
- Cooling System
- Commo System
- Missiles

## GENERIC EQUIPMENT LIST

- Man-Portable Indirect Fire (Mortar)
  - Baseplate
  - Tube
  - Sight
- Man-Portable Antitank
  - Launcher
  - Missile
  - Tracker
- Rifle, Automatic Weapons, Grenade Launcher
  - Barrel
  - Receiver Group
  - Firing Mechanism
- Man-Portable Air Defense System
  - Missile
  - Launcher
  - Seeker
  - IFF

## GENERIC EQUIPMENT LIST

### Tanks

- Power Plant
- Power Train
- Tracks & Suspension
- Steering & Braking System
- Fuel System
- Electrical System
- Hydraulic System
- Ventilation System
- Chassis, Armor Plating, and Crew Compartments
- Instruments and Gauges
- Communications System
- Fire Control System
- Armament System
  - Main Armament
  - Secondary Armament
  - Smoke Generators
- Turret Drive & Stabilization System
- Auxiliary Systems
  - Fire Suppression
  - Decontamination
  - Climate Control
  - Night Vision

## GENERIC EQUIPMENT LIST

### Medium Range Missiles

- Missile Round
  - Main Missile Assembly
  - Warhead Section
- Monitor-Programmer
- Firing Device
- Azimuth Laying Set
- Self Propelled Launcher
  - Power Plant
  - Power Train
  - Tracks & Suspension
  - Steering & Braking
  - Fuel System
  - Electrical System
  - Hydraulic System
  - Ventilation System
  - Chassis & Crew Compartments
  - Instruments & Gauges
  - Communications System
  - Auxiliary Systems

## GENERIC EQUIPMENT LIST

### Self Propelled Howitzers

- Power Plant
- Power Train
- Tracks & Suspension
- Steering & Braking System
- Fuel System
- Electrical System
- Hydraulic System
- Ventilation System
- Chassis & Crew Compartments
- Instruments & Gauges
- Communications System
- Sighting & Fire Control Equipment
- Howitzer Cannon
- Howitzer Mount
- Ammunition

## GENERIC EQUIPMENT LIST

### Towed Howitzers

- Wheels & Suspension
- Sighting System
- Elevating & Traversing Mechanism
- Howitzer Cannon
- Howitzer Mount
- Recoil Mechanism
- Base & Stabilization System
- Ammunition

## GENERIC EQUIPMENT LIST

### Artillery Rocket Systems

- Launcher Drive System
- Launcher Loader Module
- Fire Control System
  - Fire Control Unit
  - Launcher Control Unit
  - Remote Fire Unit
  - Stabilization Ref. Package/Position Determining System
- Tracked Carrier
  - Power Plant
  - Power Train
  - Tracks & Suspension
  - Steering & Braking
  - Fuel System
  - Electrical System
  - Hydraulic System
  - Ventilation System
  - Chassis & Crew Compartments
  - Instruments & Gauges
  - Communications System
  - Auxiliary Systems

## GENERIC EQUIPMENT LIST

### Air Defense Gun Systems

- Power Plant
- Power Train
- Tracks & Suspension
- Steering & Braking
- Electrical System
- Hydraulic System
- Ventilation System
- Chassis & Crew Compartments
- Instruments & Gauges
- Communications System
- Turret & Stabilization System
- Fire Control & Sighting System
- Surveillance Radar System
- Tracking Radar System
- Auxiliary Systems



#### 4.2.9 - Maintenance Hour Allocations by Generic Equipment Type

The maintainability requirements for a weapon system are specified by allocating the maintenance hours to the generic equipment types for the system, and then to the maintenance tasks within each equipment type. This library is the one that will aid the user in allocating the maintenance requirements to the generic equipment.

**UH-60 CORRECTIVE MAINTENANCE ACTIONS AND MANHOURS BY  
MAJOR SUBSYSTEM AND MAINTENANCE LEVEL**

SUBSYSTEM	AVUM		AVIM	
	NUMBER	MMHs	NUMBER	MMHs
airframe	22%	24%	30%	26%
landing gear	4%	4%	4%	5%
power plant	9%	12%	11%	11%
rotor & drive	19%	27%	20%	25%
pneudral-ics	3%	2%	2%	1%
instru-ments	6%	3%	4%	2%
electric	7%	4%	8%	9%
fuel	1%	1%	1%	2%
flight controls	8%	10%	5%	7%
avionics	15%	10%	12%	9%
utility	6%	3%	4%	3%
TOTAL	100%	100%	100%	100%

UH-60 CORRECTIVE MAINTENANCE MANHOURS PER FLIGHT HOUR BY  
MAJOR SUBSYSTEM AND MAINTENANCE LEVEL

SUBSYSTEM	AVUM	AVIM
airframe	.30	.123
landing gear	.047	.025
power plant	.144	.052
rotor & drive	.335	.119
pneudral-ics	.032	.003
instru-ments	.039	.008
electric	.05	.042
fuel	.006	.007
flight controls	.118	.032
avionics	.126	.041
utility	.039	.013
TOTAL	1.24	.469

NOTE: Based on 75,076.6 total flight hours

UH-60 MEAN TIME BETWEEN CORRECTIVE MAINTENANCE ACTION BY  
MAJOR SUBSYSTEM

SUBSYSTEM -----	MTBCMA -----
airframe	6.23
landing gear	34.74
power plant	15.30
rotor & drive	7.32
pneudraulics	48.03
instruments	24.88
electrical	20.49
fuel	180.47
flight controls	18.39
avionics	9.63
utility	25.96
TOTAL	1.42

NOTE: Based on 75,076.6 total flight hours

## SYSTEM

UH 60

Subsystem	AVUM		AVIM	
	# Actions	MMHs	# Actions	MMHs
Airframe	15,376 22%	22,570.6 24%	1683 30%	9277.9 26%
Landing Gear	1960 4%	3524.2 4%	201 4%	1898.4 5%
Power Plant	4279 9%	10,833.4 12%	628 11%	3923.3 11%
Rotor & Drive	9161 19%	25,154.7 27%	1093 20%	8912.7 25%
Pneudral-ics	1474 3%	2470.9 2%	89 2%	212.8 1%
Instru-ments	2808 6%	2965.6 3%	209 4%	637.4 2%
Electric	3242 7%	3763.9 4%	421 8%	3193.2 9%
Fuel	372 1%	487.5 1%	44 1%	584.2 2%
Flight Controls	3775 8%	8857.6 10%	307 5%	2470.1 7%
Avionics	7148 15%	9477.9 10%	644 12%	3106 9%
Utility	2683 6%	2984.1 3%	209 4%	984.5 3%
TOTAL	47,278	93,104.4	5528	35200.5

Total flight hrs. = 75576.6

10376	22590.6	1683	9277.9	0.219467	0.244728	0.304450	0.263572
1960	3524.2	201	1898.4	0.041456	0.038178	0.036360	0.053931
4279	10833.4	628	3923.3	0.090507	0.117360	0.113603	0.111455
9161	25154.7	1093	8912.7	0.193768	0.272505	0.197720	0.253198
1474	1675.3	89	212.8	0.031177	0.018148	0.016099	0.006045
2808	2965.6	209	637.4	0.059393	0.032126	0.037807	0.018107
3242	3763.9	421	3193.2	0.068573	0.040775	0.076157	0.090714
372	487.5	44	584.2	0.007868	0.005281	0.007959	0.016596
3775	8851.6	307	2470.1	0.079846	0.095891	0.055535	0.070172
7148	9477.9	644	3106	0.151190	0.102676	0.116497	0.088237
2683	2984.1	209	984.5	0.056749	0.032327	0.037807	0.027968
-----							
47278	92308.8	5528	35200.5				

CH-47D  
MTTR

AVUM

	NUMBER	TIME	MTTR
AIRFRAME	1253	1605.7	1.28
LAND GEAR	106	56.9	0.54
CONTROLS	3662	688.5	0.19
ROTOR/TRA	1122	1395.2	1.24
ENGINE	794	851.8	1.07
HYDRAUL	269	180.7	0.67
INSTRUMEN	223	86.9	0.39
ELECTRIC	395	174.3	0.44
FUEL	203	448.2	2.21
AVIONICS	306	92	0.3
UTILITY	306	258.7	0.85
	-----		
	8639	5838.9	0.68

AVIM

	NUMBER	TIME	MTTR
	69	286.1	4.15
	5	2.6	0.52
	16	22.8	1.43
	88	339.7	3.86
	41	107.4	2.62
	13	15.8	1.22
	10	6.3	0.63
	53	221.4	4.18
	11	100	9.09
	38	59.2	1.56
	20	32.2	1.61
	-----		
	364	1193.5	3.28

SYSTEM CH-47D

Subsystem	AVUM		AVIM	
	# Actions	MMHs	# Actions	MMHs
Airframe	4716	15,574.7	1335	10522
Landing Gear	655	1756.7	14	30.7
Power Plant	2752	10,111.1	89	1204.9
Rotor & Drive	4452	21,941.5	226	2668
Pneudral-ics	477	1218.4	18	82.1
Instru-ments	1284	2733.2	18	88.6
Electric	1840	2780.5	89	386.1
Fuel	667	2721.7	53	575.9
Flight Controls	1867	5615.1	34	87.5
Avionics	1985	3168.3	92	264.9
Utility	1345	3195.3	33	154.5
TOTAL	22040	70816.5	2001	16065.2

# flight hrs. = 29605.2



1392	7435.9	81	1431.4	0.063157	0.105002	0.040479	0.088993
3028	3919.7	84	171.3	0.137386	0.055350	0.041979	0.010650
3327	15631.3	69	1197.9	0.150952	0.220729	0.034482	0.074476
14289	43817.9	1765	13279.7	0.648321	0.618752	0.882058	0.825631
4	11.7	2	4	0.000181	0.000165	0.000999	0.000248

---

22040	70816.5	2001	16084.3
-------	---------	------	---------

6	10	4	9
14	6	4	1
15	22	39	7
65	62	88	83
.01	.01	.1	.02

4716	15574.7	1335	10522	0.213974	0.219930	0.667166	0.654956
655	1756.7	14	30.7	0.029718	0.024806	0.006996	0.001910
2752	10111.1	89	1204.9	0.124863	0.142778	0.044477	0.075000
4452	21941.5	226	2668	0.201996	0.309835	0.112943	0.166073
477	1218.4	18	82.1	0.021642	0.017205	0.008995	0.005110
1284	2733.2	18	88.6	0.058257	0.038595	0.008995	0.005515
1840	2780.5	89	386.1	0.083484	0.039263	0.044477	0.024033
667	2721.7	53	575.9	0.030263	0.038433	0.026486	0.035847
1867	5615.1	34	87.5	0.084709	0.079290	0.016991	0.005446
1985	3168.3	92	264.9	0.090063	0.044739	0.045977	0.016489
1345	3195.3	33	154.5	0.061025	0.045120	0.016491	0.009617

---

22040	70816.5	2001	16065.2
-------	---------	------	---------

21  
3  
13  
20  
2  
6  
9  
9  
3  
8  
6  
6

22  
2  
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31  
2  
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4  
4  
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5

67  
1  
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11  
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3  
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2

65  
11  
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17  
15.  
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2  
4  
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2  
1

CH-47 CORRECTIVE MAINTENANCE MANHOURS PER FLIGHT HOUR BY  
MAJOR SUBSYSTEM AND MAINTENANCE LEVEL

SUBSYSTEM	AVUM	AVIM
airframe	.53	.36
landing gear	.06	.001
power plant	.34	.04
rotor & drive	.741	.09
pneudral-ics	.04	.003
instru-ments	.043	.003
electric	.093	.013
fuel	.091	.019
flight controls	.19	.003
avionics	.107	.009
utility	.108	.005
TOTAL	2.39	.543

NOTE: Based on 29,605.2 total flight hours

CH-47 CORRECTIVE MAINTENANCE ACTIONS AND MANHOURS BY  
MAJOR SUBSYSTEM AND MAINTENANCE LEVEL

SUBSYSTEM	AVUM		AVIM	
	NUMBER	MMHs	NUMBER	MMHs
airframe	21%	22%	67%	65%
landing gear	3%	2%	1%	.1%
power plant	13%	14%	4%	7%
rotor & drive	20%	31%	11%	17%
pneudral-ics	2%	2%	1%	.5%
instru-ments	6%	4%	1%	.5%
electric	8%	4%	4%	2%
fuel	3%	4%	3%	4%
flight controls	9%	8%	2%	.5%
avionics	9%	4%	4%	2%
utility	6%	5%	2%	1%
TOTAL	100%	100%	100%	99.6%

CH-47 MEAN TIME BETWEEN CORRECTIVE MAINTENANCE ACTION BY  
MAJOR SUBSYSTEM

SUBSYSTEM -----	MTBCMA -----
airframe	4.89
landing gear	44.25
power plant	10.42
rotor & drive	6.33
pneudraulics	59.80
instruments	22.74
electrical	15.35
fuel	41.12
flight controls	15.57
avionics	14.25
utility	21.48
TOTAL	1.23

NOTE: Based on 29,605.2 total flight hours

#### 4.2.10 - Maintenance Hour Allocations by Maintenance Task

The maintainability requirements for a weapon system are specified by allocating the maintenance hours to the generic equipment types for the system, and then to the maintenance tasks within each equipment type. This library is the one that will aid the user in allocating the maintenance requirements to the maintenance tasks within each generic equipment type.

UH-60 CORRECTIVE MAINTENANCE ACTIONS AND MANHOURS BY  
ACTION TYPE AND MAINTENANCE LEVEL

TYPE ACTION	AVUM		AVIM	
	NUMBER	MMHs	NUMBER	MMHs
inspect	12%	16%	7%	15%
trouble shoot	17.1%	5.9%	6%	2%
replace	32%	44%	19%	26%
adjust/ repair	38.8%	34%	66%	56%
test/ check	.1%	.1%	2%	1%
TOTAL	100%	100%	100%	100%

SYSTEM UH-60

Type Action	AVUM		AVIM	
	#	MMHs	#	MMHs
Inspect	5600	14546	368	5224.9
	127%	16%	7%	15%
Trouble Shoot	8244	5467.6	354	739.5
	17%	<del>18%</del>	6%	12%
Replace	15,048	4,111.6	1065	9060.9
	32%	44%	19%	26%
Adjust/Repair	18,332	31,278.4	3663	19,894.2
	38.8%	<del>38.8%</del>	66%	56%
Test/Check	54	100.8	78	281
	.1%	.1%	2%	1%
TOTAL	47,278	93,104.4	5528	35200.5



## Inspect

## Tr.Shoot

Number	AVUM MMHs
2004	8654.7
3	0.6
641	1030.7
1530	2427.6
2	74.5
104	37
12	8.7
0	0
695	1921.5
435	259.8
174	130.9
-----	
5600	14546

Number	AVIM MMHs	Number	AVUM MMHs
144	1633.9	911	484.5
11	61.6	493	205.2
47	144.7	617	539.4
93	1630.8	1130	708.7
1	0.5	305	197.3
8	6.7	945	597.6
6	142	470	316.9
3	305.6	78	41.6
37	1271.8	703	597
17	26.9	2160	1529
1	0.4	432	250.4
-----		-----	
368	5224.9	8244	5467.6

# Replace

AVIM Number	MMHs	Number	AVUM MMHS
41	92.8	1929	4810.1
15	18.3	1053	2671.1
16	21.9	1049	5362.5
28	106.7	2744	13550.5
8	6	497	1314.8
63	112.3	1185	1647.6
25	100.5	1993	2380.4
1	0.2	68	261.7
32	42.7	557	2569
113	229.6	3051	5113.6
12	8.5	922	1430.3
<hr/>			
354	739.5	15048	41111.6

AVIM Number	MMHs	Number
178	939.5	5530
110	465.2	409
144	1759.2	1956
276	3558.9	3746
18	96.6	669
44	107.7	571
57	440.3	766
12	103.7	226
60	616.5	1817
86	592.6	1492
80	380.7	1150
<hr/>		
1065	9060.9	18332

Adjust/Re		Test/Ch	
AVUM MMHs	AVIM Number	AVUM MMHs	AVIM Number
8641	1319	6611.2	2
646.5	65	1353.3	2
3868.6	411	1952	16
8444.9	696	3616.3	11
<del>88.4</del> 884	61	103.7	1
677.8	92	405.2	3
1050.4	305	2348	1
184.2	28	174.7	0
3761	176	536	3
2549.4	394	2198.9	10
1170.6	116	594.9	5
-----		-----	
31082.8	3663	19894.2	54
		100.8	
			78

MMHs

0.5

0

45.5

0

6

5.5

162.4

0

3.1

58

0

281

5600	14546	368	5224.9	0.118448	0.157579	0.066570	0.148432
8244	5467.6	354	739.5	0.174372	0.059231	0.064037	0.021008
15048	41111.6	1065	9060.9	0.318287	0.445370	0.192655	0.257408
18332	31082.8	3663	19894.2	0.387749	0.336726	0.662626	0.565168
54	100.8	78	281	0.001142	0.001091	0.014109	0.007982
<hr/>							
47278	92308.8	5528	35200.5				

SYSTEM

UH-60

Subsystem

Pneudraulic System

	AVUM		AVIM	
	# Actions	MMHs	# Actions	MMHs
- Inspect	2	74.5	1	1.5
- Trouble Shoot	305	197.3	8	6
- Replace	497	1314.8	18	96.6
- Adjust/Repair	669	884	61	103.7
- Test/Check	1	.3	1	6
TOTAL	1474	1675.3	89	212.8

SYSTEM

UH-60

Subsystem

Airframe

	AVUM		AVIM	
	# Actions	MMHs	# Actions	MMHs
- Inspect	2004	8654.7	144	1633.9
- Trouble Shoot	911	484.5	41	92.8
- Replace	1929	4810.1	178	939.5
- Adjust/Repair	5530	8641.0	1319	6611.2
- Test/Check	2	.3	1	.5
TOTAL	10,376	22,590.6	1683	9277.9

SYSTEM UH-60

Subsystem Landing Gear

	AVUM		AVIM	
	# Actions	MMHs	# Actions	MMHs
- Inspect	3	.6	11	61.6
- Trouble Shoot	413	205.2	15	18.3
- Replace	1053	2671.1	110	465.2
- Adjust/Repair	409	646.5	65	1353.3
- Test/Check	2	.8	0	0
TOTAL	1960	3524.2	201	1898.4



SYSTEM

UH-60

Subsystem

Power Plant

	AVUM		AVIM	
	# Actions	MMHs	# Actions	MMHs
- Inspect	641	1030.7	47	144.7
- Trouble Shoot	617	539.4	16	21.9
- Replace	1049	5362.5	144	1759.2
- Adjust/Repair	1956	3868.6	411	1952
- Test/Check	16	32.2	10	45.5
TOTAL	4279	10833.4	628	3923.3

SYSTEM

UH-60

Subsystem

Transmission &amp; Motor

	AVUM		AVIM	
	# Actions	MMHs	# Actions	MMHs
- Inspect	1530	2427.6	93	1630.8
- Trouble Shoot	1130	708.7	28	106.7
- Replace	2744	13550.5	276	3558.9
- Adjust/Repair	3746	8444.9	696	3616.3
- Test/Check	11	23	0	0
TOTAL	9161	25,154.7	1093	8912.7

SYSTEM

UH-60

Subsystem

Instruments

	AVUM		AVIM	
	# Actions	MMHs	# Actions	MMHs
- Inspect	104	37	8	6.7
- Trouble Shoot	945	597.6	63	112.3
- Replace	1185	1647.6	44	107.7
- Adjust/Repair	571	677.8	92	405.2
- Test/Check	3	5.6	2	5.5
TOTAL	2808	2965.6	209	637.4

SYSTEM

UH-60

Subsystem

Electrical

	AVUM		AVIM	
	# Actions	MMHs	# Actions	MMHs
- Inspect	12	8.7	6	142
- Trouble Shoot	470	316.9	25	100.5
- Replace	1993	2380.4	57	440.3
- Adjust/Repair	766	1050.4	305	2348
- Test/Check	1	7.5	28	162.4
TOTAL	3242	3763.9	421	3193.2

SYSTEM UH-60

Subsystem Fuel System

	AVUM		AVIM	
	# Actions	MMHs	# Actions	MMHs
- Inspect	0	0	3	305.6
- Trouble Shoot	78	41.6	1	.2
- Replace	68	261.7	12	103.7
- Adjust/Repair	226	184.2	28	174.7
- Test/Check	0	0	0	0
TOTAL	372	487.5	44	584.2

SYSTEM UH-60

Subsystem Flight Controls

	AVUM		AVIM	
	# Actions	MMHs	# Actions	MMHs
- Inspect	695	1921.5	37	1271.8
- Trouble Shoot	703	597	32	42.7
- Replace	557	2569	60	616.5
- Adjust/Repair	1817	3761	176	536
- Test/Check	3	3.1	2	3.1
TOTAL	3775	8851.6	307	2470.1

SYSTEM

UH-60

Subsystem

Avionics

	AVUM		AVIM	
	# Actions	MMHs	# Actions	MMHs
- Inspect	435	259.8	17	26.9
- Trouble Shoot	2160	1529	113	229.6
- Replace	3057	5713.6	86	592.6
- Adjust/Repair	1492	2549.4	394	2198.9
- Test/Check	10	26.1	34	58
TOTAL	7148	9477.9	644	3106

SYSTEM

UH-60

Subsystem

Utility System

	AVUM		AVIM	
	# Actions	MMHs	# Actions	MMHs
- Inspect	174	130.9	1	.4
- Trouble Shoot	432	250.4	12	8.5
- Replace	922	1430.3	80	380.7
- Adjust/Repair	1150	1170.6	116	594.9
- Test/Check	5	1.9	0	0
TOTAL	2683	2984.1	209	984.5



CH-47 CORRECTIVE MAINTENANCE ACTIONS AND MANHOURS BY  
ACTION TYPE AND MAINTENANCE LEVEL

TYPE ACTION	AVUM		AVIM	
	NUMBER	MMHs	NUMBER	MMHs
inspect	6%	10%	4%	9%
trouble shoot	14%	6%	4%	1%
replace	15%	22%	3.9%	7%
adjust/ repair	65%	62%	88%	83%
test/ check	.01%	.01%	.1%	.02%
TOTAL	100.01%	100.01%	100%	100.02%

# Run Log Data Base

SYSTEM

CH-47 (RL)

Total Flight  
hrs. = 5256

Subsystem

Airframe

	AVUM		AVIM	
	# Actions	CT	# Actions	CT
- Inspect	127	119	10	87.7
- Trouble Shoot	208	19.2	No data	No data
- Replace	234	270.1	13	25.1
- Adjust/Repair	684	7197.4	46	173.3
- Test/Check	No data	No data	No data	No data
TOTAL	1253	1605.7	69	286.1

$$MTTR_{(AVUM)} = 1.28$$

$$MTTR_{(AVIM)} = 4.15$$

SYSTEM

CH-47 (RL)

Subsystem

Landing Gear

	AVUM		AVIM	
	# Actions	CT	# Actions	CT
- Inspect	9	1.2	No data	No data
- Trouble Shoot	43	4.3	No data	No data
- Replace	29	39.2	3	1.8
- Adjust/Repair	25	12.2	2	.8
- Test/Check	No data	No data	No data	No data
TOTAL	106	56.9	5	2.6

$$MTTR_{(AVUM)} = .54$$

$$MTTR_{(AVIM)} = .52$$

SYSTEM CH-47 (BL)

Subsystem Flight Controls

	AVUM		AVIM	
	# Actions	CT	# Actions	CT
- Inspect	3240	192.3	6	1.8
- Trouble Shoot	72	43.3	3	.8
- Replace	95	236	3	9.5
- Adjust/Repair	158	200.4	4	10.7
- Test/Check	97	16.5	No data	No data
TOTAL	3662	688.5	16	22.8

$$MTTR_{(AVUM)} = .19$$

$$MTTR_{(AVIM)} = 1.43$$

SYSTEM

CH-47 (RL)

Subsystem

Rotor + Transmission

	AVUM		AVIM	
	# Actions	<del>CT</del>	# Actions	<del>CT</del>
- Inspect	546	600.9	39	207.7
- Trouble Shoot	124	42.7	7	1.9
- Replace	177	352	24	97
- Adjust/Repair	274	399.5	17	31.1
- Test/Check	1	.1	1	2
TOTAL	1122	1395.2	88	339.7

$$MTTR_{(AVUM)} = 1.24$$

$$MTTR_{(AVIM)} = 3.86$$

SYSTEM

CH-47 (R)

Subsystem

Power Plant

	AVUM		AVIM	
	# Actions	CT	# Actions	CT
- Inspect	93	59.2	1	.7
- Trouble Shoot	145	39.9	4	7.4
- Replace	234	405.5	16	69
- Adjust/Repair	309	341.9	19	28.6
- Test/Check	13	5.3	1	1.7
TOTAL	794	851.8	41	107.4

$$MTTR_{(AVUM)} = 1.07$$

$$MTTR_{(AVIM)} = 2.62$$

SYSTEM CH-47 (PL)

Subsystem Hydraulic

	AVUM		AVIM	
	# Actions	CT	# Actions	CT
- Inspect	3	.4	1	2.1
- Trouble Shoot	33	7.3	1	.1
- Replace	73	83	4	6.5
- Adjust/Repair	160	90	7	7.1
- Test/Check	No data	No data	No data	No data
TOTAL	269	180.7	13	15.8

$$MTTR_{(AVUM)} = .67$$

$$MTTR_{(AVIM)} = 1.22$$

SYSTEM CH-47 (RL)

Subsystem Instruments

	AVUM		AVIM	
	# Actions	<u>CT</u>	# Actions	<u>CT</u>
- Inspect	39	11.9	No data	No data
- Trouble Shoot	71	16.4	5	4.0
- Replace	59	30	5	2.3
- Adjust/Repair	49	26.8	No data	No data
- Test/Check	5	1.8	No data	No data
TOTAL	223	86.9	10	6.3

$$MTTR_{(AVUM)} = .39$$

$$MTTR_{(AVIM)} = .63$$



SYSTEM

CH-47 (RL)

Subsystem

Electrical

	AVUM		AVIM	
	# Actions	CT	# Actions	CT
- Inspect	57	16.2	28	139.8
- Trouble Shoot	55	5.3	No data	No data
- Replace	188	100.4	2	.5
- Adjust/Repair	95	52.4	22	57.8
- Test/Check	No data	No data	1	23.3
TOTAL	395	174.3	53	221.4

$$MTTR_{(AVUM)} = .44$$

$$MTTR_{(AVIM)} = 4.18$$

SYSTEM

CH-47 (RL)

Subsystem

Fuel

	AVUM		AVIM	
	# Actions	CT	# Actions	CT
- Inspect	18	9.9	No data	No data
- Trouble Shoot	69	35.4	1	15
- Replace	50	170.6	7	34.1
- Adjust/Repair	65	229.4	3	65.4
- Test/Check	1	2.9	No data	No data
TOTAL	203	448.2	11	100

$$MTTR_{(AVUM)} = 2.21$$

$$MTTR_{(AVIM)} = 9.09$$

SYSTEM

CH-47 (RL)

Subsystem

Avionics

	AVUM		AVIM	
	# Actions	CT	# Actions	CT
- Inspect	No data	No data	No data	No data
- Trouble Shoot	103	20.9	10	3
- Replace	106	44.9	1	.2
- Adjust/Repair	97	26.2	26	55.4
- Test/Check	No data	No data	1	.6
TOTAL	306	92.0	38	59.2

$$MTTR_{(AVUM)} = .30$$

$$MTTR_{(AVIM)} = 1.56$$

SYSTEM CH-47 (PL)

Subsystem Utility

	AVUM		AVIM	
	# Actions	<del>CT</del>	# Actions	<del>CT</del>
- Inspect	50	39.2	No data	No data
- Trouble Shoot	86	47.3	14	25.8
- Replace	79	104.7	3	5.1
- Adjust/Repair	91	67.5	3	1.3
- Test/Check	No data	No data	No data	No data
TOTAL	306	258.7	20	32.2

$$MTTR_{(AVUM)} = 1.85$$

$$MTTR_{(AVIM)} = 1.61$$

SYSTEM

CH-47D (SDC)

Subsystem

Airframe + Fuselage

	AVUM		AVIM	
	# Actions	MMHs	# Actions	MMHs
- Inspect	375	3901.3	12	586.2
- Trouble Shoot	274	190.8	25	22.4
- Replace	188	536.1	6	14.4
- Adjust/Repair	3878	10,945.7	1292	989.1
- Test/Check	1	.8	0	0
TOTAL				

SYSTEM CH-47D (SDC)

Subsystem Landing Gear

	AVUM		AVIM	
	# Actions	MMHs	# Actions	MMHs
- Inspect	2	7.3	0	0
- Trouble Shoot	121	99.1	3	1.5
- Replace	94	426.5	1	3.2
- Adjust/Repair	438	1223.8	10	27.5
- Test/Check	0	0	0	0
TOTAL				

SYSTEM

CH-47D (SDC)

Subsystem

Engine (+APU + Powerplant Install)

	AVUM		AVIM	
	# Actions	MMHs	# Actions	MMHs
- Inspect	11	7.5	0	0
- Trouble Shoot	370	471.2	2	3.3
- Replace	491	3137.3	8	355.2
- Adjust/Repair	1880	6495.1	79	846.4
- Test/Check	0	0	0	0
TOTAL				

SYSTEM

CH-47D (SDC)

Subsystem

Rotor + Transmission

	AVUM		AVIM	
	# Actions	MMHs	# Actions	MMHs
- Inspect	789	3281.7	66	820.7
- Trouble Shoot	466	721.9	14	54.4
- Replace	640	6571.9	23	674
- Adjust/Repair	2556	11,358	123	1118.9
- Test/Check	1	8	0	0
TOTAL				



SYSTEM

CH-47 (SDC)

Subsystem

Controls

	AVUM		AVIM	
	# Actions	MMHs	# Actions	MMHs
- Inspect	101	99.6	0	0
- Trouble Shoot	271	358.2	3	2.9
- Replace	327	1507.8	4	56.8
- Adjust/Repair	1167	3647.6	27	27.8
- Test/Check	1	1.9	0	0
TOTAL				

SYSTEM CH-47D (SOC)

Subsystem Electric (power + lighting)

	AVUM		AVIM	
	# Actions	MMHs	# Actions	MMHs
- Inspect	36	21	2	2.5
- Trouble Shoot	169	143.8	3	2.5
- Replace	805	1355.3	8	11.6
- Adjust/Repair	830	1260.4	76	369.5
- Test/Check	0	0	0	0
TOTAL				

SYSTEM CH-47D (SDC)

Subsystem Fuel

	AVUM		AVIM	
	# Actions	MMHs	# Actions	MMHs
- Inspect	4	15	0	0
- Trouble Shoot	152	288.8	4	10.7
- Replace	82	429.7	1	39.1
- Adjust/Repair	429	1988.2	48	526.1
- Test/Check	0	0	0	0
TOTAL				

SYSTEM

CH-47D (SDG)

Subsystem

Hydraulic & Pneumatic

	AVUM		AVIM	
	# Actions	MMHs	# Actions	MMHs
- Inspect	0	0	0	0
- Trouble Shoot	38	28.7	3	10.4
- Replace	81	310.9	5	18.9
- Adjust/Repair	358	878.8	10	52.4
- Test/Check	0	0	0	0
TOTAL				

SYSTEM CH-47D (SDC)

Subsystem Instruments

	AVUM		AVIM	
	# Actions	MMHs	# Actions	MMHs
- Inspect	0	0	0	0
- Trouble Shoot	409	648.4	4	15.6
- Replace	65	119.6	0	0
- Adjust/Repair	810	1965.2	12	69
- Test/Check	0	0	2	4
TOTAL				

SYSTEM CH-47D (SD)

Subsystem Avionics (HF, VHF, <sup>✓</sup>UHF, <sup>✓</sup>Int Comm, <sup>✓</sup>IFF, <sup>✓</sup>CAI)  
✓ MISC Commo

	AVUM		AVIM	
	# Actions	MMHs	# Actions	MMHs
- Inspect	2	1.9	0	0
- Trouble Shoot	530	600.7	22	38.1
- Replace	383	698.4	13	24.7
- Adjust/Repair	1070	1867.3	57	202.1
- Test/Check	0	0	0	0
TOTAL				

SYSTEM

CH-47D (SDC)

Subsystem

UH-1H, Auto Pilot + Emergency, Heading

	AVUM		AVIM	
	# Actions	MMHs	# Actions	MMHs
- Inspect	72	160.6	1	4
- Trouble Shoot	228	368.1	1	9.5
- Replace	171	537.8	0	0
- Adjust/Repair	873	2187.8	31	141
- Test/Check	1	1	0	0
TOTAL				

#### 4.2.11 - Baseline Time and Accuracy Values by Function and Task

In the SPREA, the user will assign time and accuracy criteria to functions and tasks that compose a system mission. This library will contain data from a selection of existing systems that the user can access to assist him/her in this process. We have included the data which we have already gathered for this library in Appendix A.

The next page includes a summary table of the data which have been gathered. This summary table includes the number of tasks which have been identified for each system type, and the number of those tasks which have time and accuracy data which will be used in the SPREA.



SYSTEM	TOTAL TASKS #	TIME		TIME + ACCURACY (STANDARD)		ACCURACY (STANDARD)		ACCURACY (CRITERIA)	
		#	%	#	%	#	%	#	%
9. IFV	58	11	.189	1	.017	5	.086	0	-
10 Anti Tank Vehicle ITV	55	5	.090	5	.090	2	.036	0	-
11 RIFLES	19	0	-	0	-	13	.684	1	.05
12 grenade launchers	21	0	-	0	-	32	1.52	0	-
13 Anti Tank - DRAGON	14	0	-	0	-	5	.357	0	-
14 Autom. <sup>Sn</sup> Weapons	27	0	-	0	-	15	.555	0	-
15 Non-Portable motors	24	7	.291	4	.166	0	-	0	-
16 Tanks	54	41	.759	10	.185	8	.148	3	.05
17 TAV. FIGHTING VEHICLES	58	1	.0172	14	.241	0	-	0	-
18 LANCE	46	2	.043	16	.348	38	.826	1	.02
19 Towed Howitzer	52	17	.326	35	.673	9	.173	0	-
20 SELF-PROP. HOWITZER	65	18	.277	28	.431	8	.123	0	-
22 Air def MOBILE <sup>Sam</sup> VULCAN	50	12	.24	1	.02	33	.66	0	-
23 MAN PORTABLE STINGER	13	0	-	1	.077	0	-	0	-
24 ATTACK HELI	57	2	.035	4	.07	28	.49	0	-
25 Cargo HELI	64	2	.031	4	.062	15	.234	1	.017
26 Utility HELI	64	2	.031	3	.047	23	.359	0	-
27 Scout HELI	64	2	.031	4	.062	15	.234	1	.017
28 TRUCKS	21	6	.286	0	-	34	1.62	0	-

#### 4.2.12 - Baseline RAM Values by System Type

In the SPREA, the user will set reliability, maintainability, and availability requirements for each new weapon system. This library will contain data from a selection of existing systems that the user can access to assist him/her in this process.

The data which we have already gathered for this library is included in the data that were presented in Sections 4.2.9 and 4.2.10.

#### 4.2.13 - Accuracy Standards Metrics by Function and Task

Each accuracy measure for each function and task must be set according to a given standard. For example, navigation must be completed so that "the destination is reached within 500 meters", or target identification is considered accurate if "all targets within the assigned sector are identified." This library will list the accuracy standards that are applicable to each function and task.

The task data in Appendix A includes the accuracy standards which we have recorded (to date) for 19 system types. We have found that the accuracy standards are available and these data are fairly easy to gather.

## SECTION 5 - DESCRIPTION OF INPUT/OUTPUT FILES

### 5.1 External Interfaces

The data dictionaries specify the format of the data files which will be output by the SPREA. The information which is included in the specification consists of the following:

- o the name of the file
  - o a short textual description of the file contents
  - o the format of each record in the file
- NOTE: The first record of each file is an identification record. It contains information which will assist a programmer in retrieving the correct file for a given system description.
- o a precise definition of each field of each record
  - o the length of each field in the file
  - o an estimate of file length

When the user is working on a mission description, the data which he or she is modifying and entering will be stored in a mission/condition file and not in the libraries themselves. This method of storing data will serve to preserve the data which is stored in the libraries while still allowing the user to play "what if" with the values of performance parameters, the sequencing of tasks, and operating conditions.

Within steps in the SPREA process, the information that the user is entering will be temporarily stored in Random Access Memory (RAM). After a step has been completed, the contents of the RAM file will be written to the working file. In this manner, the user will be able to return to a specific step in the SPREA process on another day.

# DATA DICTIONARY FORM

File Identification: System List

Description of Contents: Lists the system description data for all systems for which there are Product 1 files

Record	Field	Description	Length	Data Type
1		Identification record	80	Alphanum.
	1	Comment field	80	Alphanum.
2 - end		System description data	118	Alphanum.
	1	Mission area	50	Alphanum.
	2	System type	30	"
	3	System name	30	"
	4	Date last accessed	8	xx/xx/xx

Estimated Number of Records = 50

Fixed or Variable Length File = Variable

# DATA DICTIONARY FORM

File Identification: System Missions

Description of Contents: Lists the missions for a specific system which have Product 1 files

Record	Field	Description	Length	Data Type
1		Identification record	118	Alphanum.
	1	Mission Area	50	Alphanum.
	2	System Type	30	"
	3	System Name	30	"
	4	Date Created	8	xx/xx/xx
2 - end		Mission Names	92	Alphanum.
	1	Mission number	12	"
	2	Mission name	80	"

Estimated Number of Records = 16

Fixed or Variable Length File = Variable

# DATA DICTIONARY FORM

File Identification: Functions per Mission

Description of Contents: Lists the functions which are members of a specific mission

Record	Field	Description	Length	Data Type
1		Identification record	42	Alphanum.
	1	System Name	30	Alphanum.
	2	Mission Number	12	"
2 - end		Function Names	93	Alphanum.
	1	Function number	12	"
	2	Function name	80	"
	3	Function type <sup>1</sup>	1	"

Estimated Number of Records = 20

Fixed or Variable Length File = Variable

<sup>1</sup>The function type can be O (operations), T (transportation), or M (maintenance).

# DATA DICTIONARY FORM

File Identification: Tasks per Function

Description of Contents: Lists the tasks which are members of a specific function

Record	Field	Description	Length	Data Type
1		Identification record	54	Alphanum.
	1	System Name	30	Alphanum.
	2	Mission Number	12	"
	3	Function Number	12	"
2 - end		Task Names	163	Alphanum.
	1	Task number	12	"
	2	Task name	80	"
	3	Decision type <sup>2</sup>	1	"
	4	Following task no. 1	12	"
	5	Prob (task no. 1) <sup>3</sup>	2	"
	6	Following task no. 2	12	"
	7	Prob (task no. 2)	2	"
	8	Following task no. 3	12	"
	9	Prob (task no. 3)	2	"
	10	Following task no. 4	12	"
	11	Prob (task no. 4)	2	"
	12	Following task no. 5 <sup>4</sup>	12	"
	13	Prob (task no. 5)	2	"

Estimated Number of Records = 8

Fixed or Variable Length File = Variable

<sup>2</sup>The decision type can be P (probabilistic) or M (multiple). A task with a probabilistic decision type will take only one of the following tasks. The following task will be chosen by selecting a number randomly and comparing it to the probabilities listed in the odd-numbered fields 5 and up. If the decision type is multiple, all of the following paths will be taken. This will cause all of the following tasks for this task to begin execution in parallel.

<sup>3</sup>If the decision type is M (multiple) then the probability fields for the following tasks will be filled with blanks.

<sup>4</sup>Five following tasks is the maximum allowable. If there are less than five possible following tasks, the remaining fields



# DATA DICTIONARY FORM

File Identification: Mission Performance Criteria

Description of Contents: Lists the performance time and accuracy criteria, as well as the accuracy standard, for the mission

Record	Field	Description	Length	Data Type
1		Identification record	54	Alphanum.
	1	System Name	30	Alphanum.
	2	Mission Number	12	"
	3	Condition Set Number	12	"
2		Mission performance	334	Alphanum.
	1	Mission Name	80	"
	2	Mission time	xxxxx.xx	flt. pt. (min)
	3	Mission Accuracy	xxx.xx	flt.pt (%)
	4	Accuracy standard	80	Alphanum.
	5	Comment	160	"

Estimated Number of Records = 8

Fixed or Variable Length File = Variable

# DATA DICTIONARY FORM

File Identification: Function Performance Criteria

Description of Contents: Lists the performance time and accuracy criteria, as well as the accuracy standard, for each function in a given mission

Record	Field	Description	Length	Data Type
1		Identification record	54	Alphanum.
	1	System Name	30	Alphanum.
	2	Mission Number	12	"
	3	Condition Set Number	12	"
2 - end		Function performance	266	Alphanum.
	1	Function number	12	"
	2	Time	xxxxx.xx	flt. pt. (min)
	3	Accuracy	xxx.xx	flt.pt (%)
	4	Accuracy standard	80	Alphanum.
	5	Comment	160	"

Estimated Number of Records = 8

Fixed or Variable Length File = Variable

# DATA DICTIONARY FORM

File Identification: Function Accuracy Weighting

Description of Contents: Lists the amount of weight assigned to each function accuracy in order to calculate mission accuracy (i.e., the probability of mission success)

Record	Field	Description	Length	Data Type
1		Identification record	54	Alphanum.
	1	System Name	30	Alphanum.
	2	Mission Number	12	Alphanum.
	3	Condition Set Number	12	"
2 - end		Function Accuracy	18	Alphanum.
	1	Function number	12	"
	2	Accuracy Weight	xxx.xx	flt. pt. (%)

Estimated Number of Records = 10

Fixed or Variable Length File = Variable

# DATA DICTIONARY FORM

File Identification: Task Performance Criteria

Description of Contents: Lists the performance time and accuracy criteria, as well as the accuracy standard, for each task in a given function

Record	Field	Description	Length	Data Type
1		Identification record	66	Alphanum.
	1	System Name	30	Alphanum.
	2	Mission Number	12	Alphanum.
	3	Function Number	12	"
	4	Condition Set Number	12	"
2 - end		Task performance	296	Alphanum.
	1	Task number	12	"
	2	Time	xxxxx.xx	flt. pt. (min)
	3	Prob (level 0) Accuracy	xxx.xx	flt.pt (%)
	4	Prob (level 1) Accuracy	xxx.xx	flt.pt (%)
	5	Prob (level 2) Accuracy	xxx.xx	flt.pt (%)
	6	Accuracy std (level 0)	80	Alphanum.
	7	Accuracy std (level 1)	80	"
	8	Accuracy std (level 2)	80	"
	9	Prob (redo) (level 0)	xxx.xx	flt.pt (%)
	10	Prob (redo) (level 1)	xxx.xx	flt.pt (%)
	11	Prob (redo) (level 2)	xxx.xx	flt.pt (%)

# DATA DICTIONARY FORM

File Identification: Corrective Maintenance Criteria

Description of Contents: Lists the maintenance ratios and MTTR by equipment by maintenance task

Record	Field	Description	Length	Data Type
1		Identification record	66	Alphanum.
	1	System Name	30	Alphanum.
	2	System Type	30	
2 - end		MRs and MTTRs	266	Alphanum.
	1	Equipment Type	20	
	2	Overall MR	xxx.xx	flt. pt.
	3	Overall MTTR	xxxxx.xx	flt. pt.
	4	Inspection ORG MR	xxx.xx	
	5	Inspection ORG MTTR	xxxxx.xx	
	6	Inspection DS MR	xxx.xx	
	7	Inspection DS MTTR	xxxxx.xx	
	8	Inspection GS MR	xxx.xx	
	9	Inspection GS MTTR	xxxxx.xx	
	10	Repair ORG MR	xxx.xx	
	11	Repair ORG MTTR	xxxxx.xx	
	12	Repair DS MR	xxx.xx	
	13	Repair DS MTTR	xxxxx.xx	
	14	Repair GS MR	xxx.xx	
	15	Repair GS MTTR	xxxxx.xx	
	16	Replace ORG MR	xxx.xx	
	17	Replace ORG MTTR	xxxxx.xx	
	18	Replace DS MR	xxx.xx	
	19	Replace DS MTTR	xxxxx.xx	
	20	Replace GS MR	xxx.xx	
	21	Replace GS MTTR	xxxxx.xx	
	22	Test ORG MR	xxx.xx	
	23	Test ORG MTTR	xxxxx.xx	

24	Test DS MR	xxx.xx
25	Test DS MTTR	xxxxx.xx
26	Test GS MR	xxx.xx
27	Test GS MTTR	xxxxx.xx
28	Troubleshoot ORG MR	xxx.xx
29	Troubleshoot ORG MTTR	xxxxx.xx
30	Troubleshoot DS MR	xxx.xx
31	Troubleshoot DS MTTR	xxxxx.xx
32	Troubleshoot GS MR	xxx.xx
33	Troubleshoot GS MTTR	xxxxx.xx

Estimated Number of Records = 13

Fixed or Variable Length File = Variable

# DATA DICTIONARY FORM

File Identification: System RAM Criteria

Description of Contents: Lists the reliability, availability, and maintainability criteria for the system

Record	Field	Description	Length	Data Type
1		Identification record	66	Alphanum.
	1	System Name	30	Alphanum.
	2	System Type	30	
	3	Scenario Comment	80	
2		Availability	6	Alphanum.
	1	Operational Availability	xxx.xx	(%)
3		Maintainability	14	
	1	Maintenance Ratio	xxx.xx	hr/op hr
	2	MTTR	xxxxx.xx	hours
4		Reliability	18	
	1	Mobility	xxxxx.xx	
	2	Measure	5	miles/km/flthr
	3	Usage (Daily)	xxxxx	
5		Reliability	18	
	1	Armaments	xxxxx.xx	
	2	Measure	5	rnds
	3	Usage (Daily)	xxxxx	
6		Reliability	18	
	1	Communication	xxxxx.xx	
	2	Measure	5	hours/mins
	3	Usage (Daily)	xxxxx	

Estimated Number of Records = 6

Fixed or Variable Length File = Fixed

# DATA DICTIONARY FORM

File Identification: Condition Set

Description of Contents: Lists the Condition Settings for a specific condition set number

Record	Field	Description	Length	Data Type
1		Identification record	92	Alphanum.
	1	Condition set name	80	Alphanum.
	2	Condition set number	12	"
2	1	Environmental (Basic)	120	Alphanum.
3	1	Terrain (Basic)	120	Alphanum.
4	1	Target/Threat (Basic)	120	Alphanum.
5	1	Friendly Force (Basic)	120	Alphanum.
6	1	Environmental (Add'l)	120	Alphanum.
7	1	Terrain (Add'l)	120	Alphanum.
8	1	Target/Threat (Add'l)	120	Alphanum.
9	1	Friendly Force (Add'l)	120	Alphanum.



The working file will contain all of the information which relates to the mission which the user is analyzing. The functions and tasks to be included in the mission that the user is studying will be contained in this file. This file will also contain the performance criteria for each task/function.

A distinction is made between library and file data primarily to ensure that the data in the libraries are only modified or supplemented with "validated system performance data." Ideally, this means that the user can enter data in task files and that once the system is fielded (or has passed its acceptance test) the user will go back and use the performance test data to update the library. The SPREA will contain an interface that will support this procedure, however, the implementation will have to be left to the users themselves.

## 5.2 External Data Sources

As demonstrated in Section 4 of this design document, much of the data required for the SPREA libraries has already been gathered. This section includes a discussion of the external data sources we will access to compile the remaining library data.

1. Combat Models - The combat models should have the latest estimates of operational capability for existing systems. These models probably will not produce data which consider the human element of the system (Van Nostrand, 1986); however, they represent the hardware component very successfully.
2. National Training Center - The NTC data base, maintained by the ARI Field Unit at Monterey, contains a wealth of data on the operational capabilities of many Army systems.

3. Field Maintenance Data Collection System - The FMDCS contains extensive data on the reliability, maintainability, and availability of existing weapon systems.
4. Unit Status Reporting System - This is the Army readiness reporting system. It contains estimates of system availability by unit.
5. Test and Evaluation Data - Data from DT/OT testing of the existing system should contain performance estimates for all three parameters.
6. ARTEPs - The ARTEPs for the unit manning the existing system will list the standards of performance which must be achieved on the collective tasks involving the new system.
7. Requirements Documents - Performance requirements should be listed in the requirements documents for existing systems. These requirements may not be stated systematically or may not be at the mission level.

The task performance criteria baselines that will be included in the Task Library will be the most difficult data to gather. These data will be gathered from existing systems. In order of estimated accuracy, the most likely data sources for obtaining information on the task performance parameters for the existing systems are:

1. National Training Center
2. Field Maintenance Data Collection System
3. Test and Evaluation Data
4. ARTEPs
5. Requirements Documents

If the analyst wants to generate his/her own task criteria data, he or she should first try to obtain values from the MAA/MADP results which initiated the need for the system. If the data from this source are not sufficient, the analyst will need to use data from existing systems to estimate task performance. In that case, he or she will need to use the same five sources listed above.

The Task Sequence Library will contain data which control the task sequencing within the missions.

In order to build the initial Task Sequence Library, operational task sequences will be developed by collecting task sequence information for existing systems. The primary data sources of this information are ARTEPs, "How To Fight" Manuals, and task sequences which may have been developed as part of the MAA or MADP within the functional area. We believe that, unlike task performance criteria, a combat developer with field experience can easily develop task sequences.

If the analyst wants to generate a new task sequence, he or she would use the same sources listed in the previous paragraph to come up with baseline sequences. After learning about the sequences of existing systems, the analyst will then be able to modify the values to reflect the system.

### 5.3 Output Report Formats

The most important output of this product is the SPREA Report which is generated after the simulation model has executed successfully.

The data that has been input by the user in the previous steps of this process and the data that is calculated during the mission simulation are inputs into the SPREA Report.

Everything in the SPREA Report will be generated automatically, the user will simply have to request the printout. The user will have the opportunity to request different portions of the report. These portions can be selected such that they offer as much or as little detail as the user desires.

The output of this step will be the SPREA Report that contains:

- o an explicit statement of the mission that was modeled and its composite functions and tasks
- o the conditions that apply to each function
- o the required and estimated system performance parameters, which include:
  - mission execution time (optional)
  - mission accuracy (optional)
  - system reliability estimates
  - the operational availability requirement
  - system maintainability estimates
  - system performance measures by function

The mission which was modeled, as well as its composite functions and tasks, will be fully documented in the SPREA Report. This documentation will also include a spreadsheet listing of the tasks with their performance criteria. These performance criteria are:

- o most likely task performance time
- o task accuracy

Finally, the documentation will supply a network drawing which indicates the predecessor/successor relationships between the tasks in each function.

Screen printouts of the individual reports are included at the end of Section 3.11. The following paragraphs include a short description of each report.

Report 1 - This is the system description report. It is a very short report that simply lists the system name, mission area, system type, mission name, and condition set.

Report 2 - This is the top-level mission description report. It includes a listing of the functions and tasks (listed by name in roughly sequential order).

Report 3 - Performance reports. The predicted mission performance time and accuracy are included in this report. The report also lists the minimally acceptable mission performance. Also includes the detailed function performance time and accuracy predictions and lists the task performance predictions, function by function. The report also includes the entire accuracy table for each task in each function.

Report 4 - System RAM. This includes the system reliability requirement report. In this report the system level reliability estimates for each of the three equipment groups are reported. These reliability estimates consist of three parts. The first part consists of the usage level for the equipment group. The second part consists of the confidence level for the usage level (i.e., the user wants to be able to fire 411 rounds per day without failure, 95% of the time). Finally, the reliability report includes the calculated MXBF for each of the three equipment groups.

It also includes the availability requirements report. This report will list the system name and the operational availability estimate for the system.

Finally, it includes the maintainability requirements report. In this report, the system level maintainability requirements will be listed, by the three maintenance levels (ORG, DS, and GS). The maintainability will be listed in MTTR and MR (Maintenance manhours per operation hour). The system maintainability requirement is allocated across the generic equipment of the system. The ORG, DS, and GS divisions are retained. This report also includes the maintainability requirements of the system, allocated to the maintainability tasks, by equipment type.

Report 5 - The function sequence report gives graphical and tabular information which identifies the sequence of functions within the mission.

Report 6 - The task sequence report gives graphical and tabular information which identifies the sequence of tasks within each function, for each function included in the mission.

Report 7 - Identifies and describes the mission condition set. This is the condition set that the user specified for the entire mission. The conditions in this set will be listed in two categories. Basic, and Additional. Within these two categories, the conditions are further divided into four types: Environmental, terrain, threat/target, and friendly force.

Report 8 - If the user indicated that the conditions could vary from function to function, then this report will be offered. This report will list the condition set which applies to each function, one-by-one.

## SECTION 6 - ALGORITHM AND MODEL DESCRIPTIONS

### 6.1 Mission Simulation Model

The Mission Simulation Model will be developed by the SPREA Applications Manager from the data that the user entered and subsequently filed in the libraries and working files. This simulation model will be based on Micro SAINT simulation, although the model development portion of Micro SAINT will be transparent to the user.

In this product, the mission performance will be analyzed using a hierarchical task network model. In the model, the mission is the top-level network. This mission network is composed of functions (sub-networks). Each of the functions in the mission is composed of a network of tasks. (The definition of missions, functions, and tasks follows that shown in the mission taxonomy in Section 4).

As the user proceeds through the steps defined in this product, he/she will be defining the mission, its composite functions and tasks, the sequence of the functions and tasks, and the performance estimates for the functions and tasks. All of this information will be combined to build a task network model of the mission.

Model execution will be accomplished using the Micro SAINT program "Exe.exe." This software program is DoD-owned, and is currently maintained by MA&D. For this reason, the software which actually controls the progression of the mission simulation model is already complete and will not need to be modified. Since this document is the design specification for the code that must be developed to support the product, we will not discuss the Micro SAINT executable program in any detail.

When the mission performance models are executed, the user will control the number of times that the model will be run. The software will save the results of each run so that they can be compared to each other in frequency distributions or other reports. This feature is also currently available in Micro SAINT and will not need to be developed.

Micro SAINT input and output files are in ASCII format. This allows our MPT products to access the Micro SAINT output without significantly modifying Micro SAINT, itself. This will be a great time saver.

Executing the mission performance model is an iterative procedure that can be described as an eight step process. A flow diagram of this process is presented in Figure 6.1-1.

In the remainder of this subsection, we will discuss each step in detail.

Step 1 - Identify the first task in the model. This step is very simple because the first task in the model will be recognized by first identifying the first function in the model. The first function in the model is the function which is listed first on the function sequence table (See Section 3, Step 6). The first task of the model, then, is the task which is listed first on the task sequence table which is associated with the first function.

Step 2 - Compute the task's completion time. The completion time for a task will be computed by adding the estimated task time to the current system clock time.

Step 3 - Insert the task into the correct position in the event queue. Since the Micro SAINT model is event driven, there is an "event queue". The event queue is a linked list data structure which contains an ordered list of all the tasks in the model



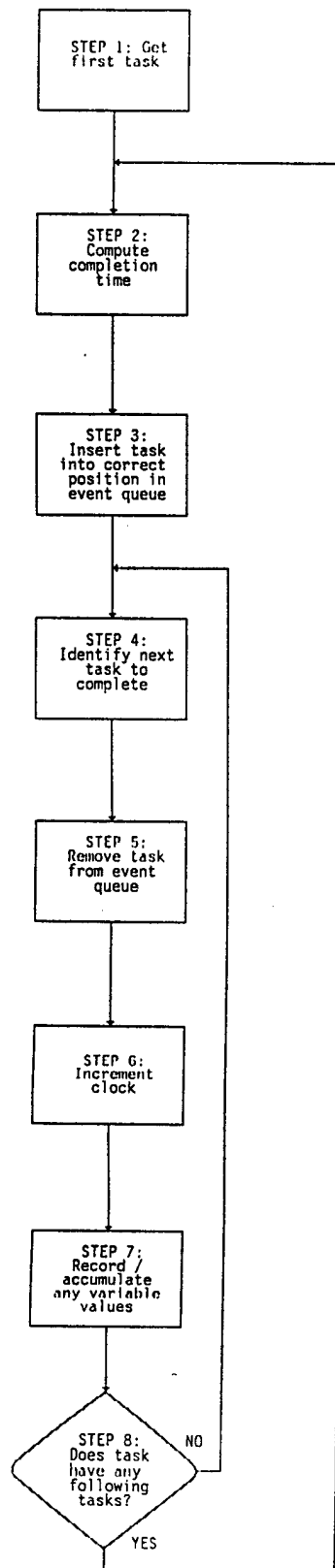


Figure 6.1-1. Performance Model Execution

which are currently executing. Each task is positioned in the event queue (i.e., the linked list) in the order that the tasks will complete. In other words, the next task to complete will be the task that is positioned at the top of the event queue. The event queue storage area contains a description of the task. This description includes the name of the task, the number of the task, any tasks which will follow this task, and the clock time at which the task will complete.

Step 4 - Identify the next task to complete. As stated in Step 3, the next task to complete will be positioned at the top of the event queue (i.e., will be the first element in the linked list).

Step 5 - Remove the next task to complete from the event queue. This consists of moving the pointer of the linked list down one position, so that it will be pointing at the second item in the event queue. This procedure establishes the second task as the "top of the queue." The description of the first item in the queue is then stored as the current execution event.

Step 6 - Increment the clock. The system clock is then updated by incrementing its value to the time at which the new task is scheduled to complete.

Step 7 - Record/accumulate any variable values. The purpose of the model is to estimate the mission/function performance. This requires that any variables which are being monitored throughout the simulation be recorded. In this step, any variable storage or calculations will be completed. If necessary, the variable values can be stored for analysis upon model completion.

Step 8 - Does the task have any following tasks? One of the descriptor fields for each task is the following task(s). If the task does have a following task, then control will be transferred to Step 2 for the new task. If the task does not have any following tasks, then control will be transferred to Step 4.

As stated previously, even though the user will not use the Micro SAINT user interface as it presently exists, we will incorporate portions of the Micro SAINT simulation language within the SPREA. Micro SAINT is currently capable of accepting ASCII data files, compiling any arithmetic expressions and functions, and building a linked discrete simulation model using the procedures discussed above. Micro SAINT is also capable of drawing network diagrams of the model and building timelines of task execution. The interface that the user will use to communicate with Micro SAINT will be MPT<sup>2</sup>-Specific and will enable the user to learn how to use the tool quickly and easily, without confusing him/her with simulation terminology and other extraneous issues.

#### 6.2 Calculating MTBF

In the SPREA, the measure of system reliability will consist of three subsets. First, the reliability of the armaments equipment group within the system will be measured using MRBF (mean rounds between failure). Second, the reliability of the mobility equipment group will be measured in MMBF (mean miles between failure). Finally, the reliability of the communication equipment group will be measured in MTBF (mean time between failure). All of these measurements will be based on the usage level which applies to the particular equipment group. The usage levels will be part of the system Operational Mode Summary.

As an example, the usage levels for a system might be:

armaments = 411 rounds / day  
communication = 14 hours / day  
mobility = 200 miles / day

The reliability of each equipment group will vary as a function of the usage level. The SPREA Report will include the reliabilities and their associated usage values.

The reliability criteria for the system will be defined in three substeps. Each of these substeps is discussed in the following paragraphs.

Substep 1: The user will consult the Operational Mode Summary to identify the appropriate usages for the new weapon system

The Operational Mode Summary will include usage statements such as:

- 1) Firepower:           83 missions/tube/day  
                      411 rounds/tube/day
- 2) Mobility:            28 moves/weapon/day  
                      25 km/weapon/day
- 3) Communications: 3 hours transmit, 6 hours receive
- 4) On-Board Electronics:   24 hours
- 5) Operating Time: 24 hours

The user will be prompted to enter these usages into the SPREA.

Substep 2: The user will input reliability factors for each usage requirement.

The user will enter reliability factors for each usage level which is specified on the operational mode summary. For example, the user will specify that he wants to fire 411 rounds/day with a 90% reliability.

Substep 3: The SPREA will calculate the appropriate reliability measure.

The SPREA will assume an exponential distribution to calculate the appropriate reliability measure (i.e., mean time between failure, mean miles between failure, mean rounds between failure).

Example:

$P(\text{Rounds} \geq 411) = .90$  (from step 1)

so

$e^{(-m * 411)} = .90$

solving for m:

$1/m = \text{mean rounds between failure}$

These calculations will yield system reliabilities. These reliabilities will be in the form of:

- 1) Mean distance between failures for mobility equipment
- 2) Mean time between failures for communication equipment
- 3) Mean rounds between failures for armaments equipment

Note:

The system reliability and maintainability estimates which are yielded by the SPREA can be cross checked against the operational availability requirement (from the combat model) in the following manner:

$$\text{Operational Availability} \leq (\text{MTBF})/(\text{MTBF} + \text{MTTR})$$

This calculation will be used by the SPREA to confirm that the required reliability and maintenance levels do yield a system availability that is at least as high as the availability from the combat model.

### 6.3 Backsolving Algorithms

The user will have the option of leaving the time and accuracy criteria for a subset of the tasks as unknown. He/she will do this by placing a "?" in the cells of the worksheet which he wishes to have the SPREA determine the correct value.

In this event, the SPREA will use the minimally acceptable mission level criteria to determine the most likely task time.

### 6.4 Resolving the Differences Between Predicted Mission Performance and the Minimally Acceptable Mission Performance

After the simulation model execution completes, the minimally acceptable system performance will be compared to the simulation results which were predicted by the model. If the predicted performance does not satisfy the minimally acceptable performance, the user will use the SPREA to correct the function and task criteria in order to meet the minimally acceptable performance.

The SPREA will aid the user in correcting any of these function or task performance criteria which are inconsistent with the minimally acceptable mission performance. The inconsistencies will have been identified in the SPREA reports which are outputs of Step 11.

The process that the user will go through to resolve any inconsistencies between the mission performance predicted by the simulation model versus the minimally acceptable mission performance criteria entered in Step 3 will be straightforward.

Case 1: The mission performance time is too long.

Causes: The predicted mission performance time can only be too long for either or both of two reasons. First, the function performance times may be too long. Since the task performance times are allocated using a percentage allocation chart, the task performance times are results of, rather than drivers of, the function performance time. The second possibility is that the task accuracies may be too low. Each task has been assigned a probability of accurate, partially inaccurate, or completely inaccurate performance. Associated with each level of accuracy, there is a probability that the task will repeat itself. Therefore, a mission performance time which is very long may be a result of some tasks repeating themselves, and thereby increasing the total execution time for the task.

Resolution: So the user will be asked whether he/she wishes to pursue resolving the mission performance time through the task accuracy avenue, or whether he/she wishes to pursue resolution through examining and reassigning function performance times.

To aid the user in resolving the mission performance time in either event, the user will first be presented with the functions and tasks on the critical path. The SPREA will also give the user an indication of the magnitude of the overrun. This indication will be a percentage. For instance, the SPREA will output "The mission performance time exceeds the requirement by 10 minutes. This is a 4% overrun."

If the user indicates that he/she wishes to modify the task accuracy table, then the tasks which are on the critical path will be presented. The user will be able to edit the accuracy estimates of any or all of the paths.

If the user indicates that he/she wishes to modify the function and task performance times, then the SPREA will ask the user whether he/she wishes to decrease all the function times on the critical path by percentage difference (in our example, 4%). The SPREA will warn the user that this may result in a different critical path. If the user does not wish to make an "across the board" reduction, the SPREA will then identify any functions on the critical path which the user did not specify performance times for (remember that the user could enter a "?" in the time cell for any function or task), and the SPREA assigned times from the baseline library. The SPREA will ask the user if he/she wishes to have the SPREA deduct the performance difference from those functions. (If there is more than one such function, then the SPREA will deduct the amount equally). If the user does not desire that solution, then the SPREA will ask him/her to edit the performance times manually.

Case 2: Mission performance accuracy (probability of mission success is too low)

Causes: If the mission performance accuracy is too low, then the only possible causes are: 1) the function accuracies are too low, or 2) the function accuracy weights have been misapplied.

Resolution: The SPREA will ask the user which path he/she wishes to pursue in order to correct the function accuracy allocations. If the user indicates that he/she wishes to examine the function accuracies, then the SPREA will present the entire set of predicted function accuracies. Now, the function accuracies can only be too low if the task accuracies are too low. Beginning with the lowest function accuracy, the user will be presented with each task which contributed to that function's accuracy measure. This will continue through the entire set of



functions, or will continue until the user opts to discontinue the process.

If the user indicates that he/she wishes to re-examine the function accuracy weights, then the SPREA will present the entire function accuracy weighting table to the user for edits. The edits will be carried out, just as in Step 7 of the process.

Case 3: Mission performance time is too long and mission accuracy is too low.

Causes: Any combination or permutation of the four causes listed in the two preceding cases apply.

Resolution: The SPREA will suggest to the user that the best plan will be to edit the task accuracy table. The values in this table influence both mission time and mission accuracy.

The user will also have the opportunity to resolve this case using any of the resolution methods discussed above.

How will the SPREA help the user?

The user will be able to access help files that will be included in the SPREA to assist him/her in making these changes. The SPREA will advise the user of the amount of variance between the predicted mission performance and the minimally acceptable mission performance. The SPREA will allow the user to change all of the task and function performance estimates by a constant percentage, and will advise the user on whether the new estimates are likely to change the performance enough to meet the minimally acceptable requirements. (This advice will be based on criteria such as:

- the number of times inaccurate task performance required that a task be repeated (which, in turn, increased the performance time for the associated function and the mission)
- the length of the critical path as compared to the length of the next most critical path
- the relative magnitude of the time and accuracy performance estimates within the mission.

In addition, the SPREA will tell the user which tasks and functions are included on the critical path. The SPREA will also inform the user of which performance estimates are the highest, and thus will show the greatest difference if all tasks are changed by a constant percentage value.

The output from this exercise consists of modified task and function performance criteria. The new criteria will be fed into Step 10, for another mission simulation. This sequence of steps (10 through 12) will iterate until the user is satisfied with the results.

## SECTION 7 - TECHNOLOGY TRANSFER ISSUES

### 7.1 Training Strategy

The goal of this software specification phase of the (MPT)<sup>2</sup> effort is to design a set of automated tools that the user can implement immediately without external training. To accomplish this, we have designed a user interface that will allow the system to be used by analysts who have very little computer experience. The primary source of training for the average user will be included in the documentation that is developed for the system.

### 7.2 Documentation Specifications

There are two types of documentation that will be developed for the SPREA: 1) user documentation, and 2) program documentation. User documentation provides the user of the SPREA with information on how to use the software and in how to use the overall tool in the MPT process. Program documentation will be used to describe the programming conventions and rules that will be used in writing the computer code that makes up the SPREA. In the following paragraphs, we have included specifications of what will be included in each type of documentation.

#### 7.2.1 User Documentation

User documentation is itself divided into two categories; "on-line help" and the "SPREA User's Guide". "On-line" help is documentation that the user can obtain by pressing the <F1> or <Shift> <F1> function keys while working with the SPREA software.

When the user presses <F1>, a context specific help message will display. This message will give the user specific information about the screen, menu, template, or prompt the user is currently

working with. This information will be brief and will generally focus on what the user is expected to do next. It will inform the user of any rules that may be in effect and will, if appropriate, provide the user with a specific example and step-by-step procedures. When the user presses <F1> while holding down the <Shift> key an alphabetical index of help information will display. From this index, the user can choose to obtain help information on any SPREA topic.

The "SPREA User's Guide" will contain detailed information on all aspects of the SPREA software and the role and use of the SPREA as a tool in the MPT process. The User's Guide will be divided into the following six sections:

1. Getting Started - This section will provide the user with step-by-step procedures for installing the SPREA software on his or her computer system and to gain access to the various components of the SPREA software.
2. Tutorial - The tutorial will give the user the background information and underlying philosophy behind the SPREA and its role in the MPT process. It will provide general training on how to use the SPREA software focusing on understanding and using the user interfaces. The tutorial will also provide the user with instruction on how to effectively use the other sections of the User's Guide.
3. Reference Section - This section will contain an alphabetically listed detailed description of each feature of the aid. The descriptions will include detailed explanations of the feature, rules (if any) governing its use, step-by-step procedures, sources of data that are required, and a list of places in the documentation where more information on the feature or related features can be found.

4. Messages - This section will contain a detailed non-technical description of all messages that can be presented to the user by the SPREA system. Included is a description of what the message means and exactly what the user can do about it.
5. Glossary - Alphabetically lists terms and acronyms that are used in the SPREA software and in the overall MPT process.
6. Index - All features, concepts, and procedures will be thoroughly indexed to key words and page numbers in the User's Guide.

#### 7.2.2 Program Documentation

The programming documentation conventions described in the next few paragraphs is included so that the source code written for the SPREA will be easily understood by current and future programmers. Clearly written and documented code makes the software easier to de-bug, modify, and enhance for future versions. Following are the programming conventions that will be employed in the development of the SPREA.

##### Indentation

We will follow an in-house standard for indentation of C language code. Nested code will be indented one tab stop per level. Curly braces should be indented by the same number of tab stops as the code they enclose and should appear alone on a line. Curly braces that match each other will then line up vertically. Figure 7.2-1 is an example of the indentation style.

In a deeply nested subroutine, the code may want to creep off the right side of the screen. When this happens, it will be conceptually more clear to create a new subroutine out of the offending code.

## SPREA SOURCE CODE INDENTATION STYLE

```
int arrayprint(array, numelements)
/*  Function to print out some elements from an array.
inputs:
    array = the array to be printed
    numelements = the number of elements to print,
                starting at 0
outputs:
    returns TRUE if success, FALSE if failure
*/
int array[]. numelements;

{
    int i;                                /* array index */

    /* check for bogus input */
    if (numelements > ARRAYSIZE)
        return(FALSE);

    /* one element on each line */
    for (i = 0; i < numelements; i++)
    {
        printf("Element number %d is: ", i);
        printf("%d\n", array[i]);
    }

    return(TRUE);
}
```

Figure 7.2-1

## General Structure

Anything but the simplest programs require a very large number of subroutines. A good way to structure code is to have the main program in one file, and have the subroutines in other files. In the SPREA software, subroutines will be grouped by function, with all the file I/O routines together in one place and all the develop routines in another. These modules will be compiled separately and linked together with the DOS Linker. Source code files should be kept to under 1000 lines long in order to make them compile quicker when a small change is needed.

## In-line Documentation

In-line documentation is the comments that the programmer puts into the source code. They provide a low-level, detailed description of what the code is doing. In-line comments will be written as the code is written and modified accordingly as the development progresses.

Each source file will have a short header containing five items of information:

1. The file name  
Otherwise listings are encountered which are difficult to track down because we don't know the name of the file.
2. The date.  
Also to identify listings.
3. The author's name.  
So we can ask questions later.

4. A description of the file's purpose.

Usually the 8-character file name is not enough to tell what it does. One or two sentences should be enough.

Backups

All of the source code for the SPREA software will be backed up early and often. The criteria for backups will be: backups should be able to survive a fire to the office with no more than one week's worth of lost work.

Testing

The SPREA programmers will, of course, test their own code as thoroughly as possible when they write it. But, programmers tend to overlook errors in the programs they've written. To combat this, we will follow a procedure known as break-testing before any software is released to the Army. The programmer will give an executable copy of his or her program to the tester, along with a clean listing of the source code. Then the tester tries to break it! In every way possible. The tester should force the program to execute every line of code as shown in the source code. This means try all branches, force every if, and produce every error message. If any bugs are found, the programmer fixes them and the tester starts all over again on the new program. When the tester can't break the software, then we know we can deliver it with confidence. We have also found that this procedure often locates bugs in sections of code other than the one being tested.



### 7.3 Means for Achieving Institutionalization

During Phase 3 of the (MPT)<sup>2</sup> effort, we will produce a detailed plan for fielding the product. This fielding plan will describe the distribution of the aid's methods, hardware, software, documentation, and training programs to specified Army users in specific Army organizations. The plan will be analogous to the Materiel Fielding Plan developed for Army weapon systems.

At the present time, we believe that successful implementation will, as a minimum, require the following activities.

Identification of Specific Users. Specific users of each product must be identified and the specific MAP activities and documents into which the product will feed must be described. This will ensure that the product has a use in the "real world". Section 2 describes our approach to this.

Incorporation of Users in Product Development. To ensure that the product meets users' needs, users will be included in the product development process. As a minimum, they should use the product during the external demonstration that will take place during Option 2.

Incorporation of Acceptability/Usability Requirements into Product Specifications. We have incorporated acceptability/usability requirements into the requirements specifications for each aid (see Acceptability/Usability Requirements in section 2). The requirements will make sure that the product is easy to use (e.g. clear documentation, on-line help, etc.).

Instruction of Key Personnel. We propose that "key" personnel receive detailed training at ARI headquarters immediately after ARI has accepted<sup>7-7</sup> the aid. These key personnel will consist of individuals who can be expected to 1) become

experts in the use of the aid, 2) become instructors in using the aid, and 3) act as consultants for ongoing applications of the aid. At the present time, we recommend that these key personnel consist of selected staff members from ARI's System's Manning Lab., members of ARI field offices who have been designated as MANPRINT support personnel, and members of the MANPRINT policy office within DCSPER.

Demonstrate Aid at User's Sites. We also recommend that demonstrations of the aid be provided at all primary user's sites. This demonstration could be conducted by contractor personnel or by the key personnel who were trained at ARI headquarters. The demonstration would include hands-on training with the aid software using "real world" examples, describe the benefits of the product, and show how the product can help users produce MAP products.

Software Maintenance. Specific Army organizations must be identified that can continuously update software, documentation, and training to reflect user applications and evolving needs.

Incorporation into Army Training Programs and Regulations. Army training courses for MANPRINT, project management, etc., must be modified to describe how the aid can help users during the MAP. Regulations and pamphlets in these areas must be modified in the same way.